...T, AUGUST 11, 1938 FIRST AERO WEEKLY IN THE WORLD REGD. AT THE G.P.O. AS A NEWSPAPER

AUG 23 1938

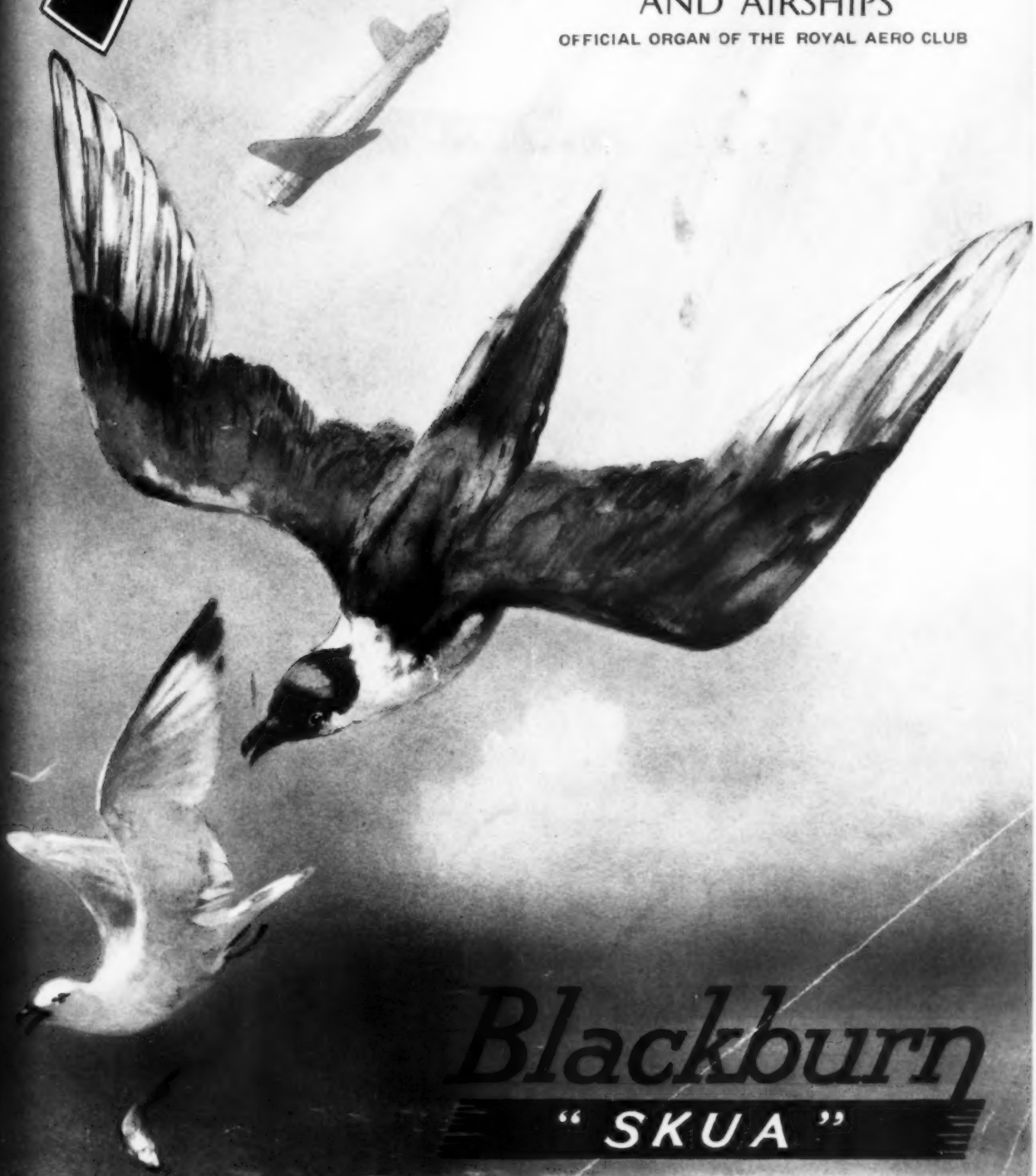
FLIGHT

6D.

1546
XXXIV

The AIRCRAFT ENGINEER AND AIRSHIPS

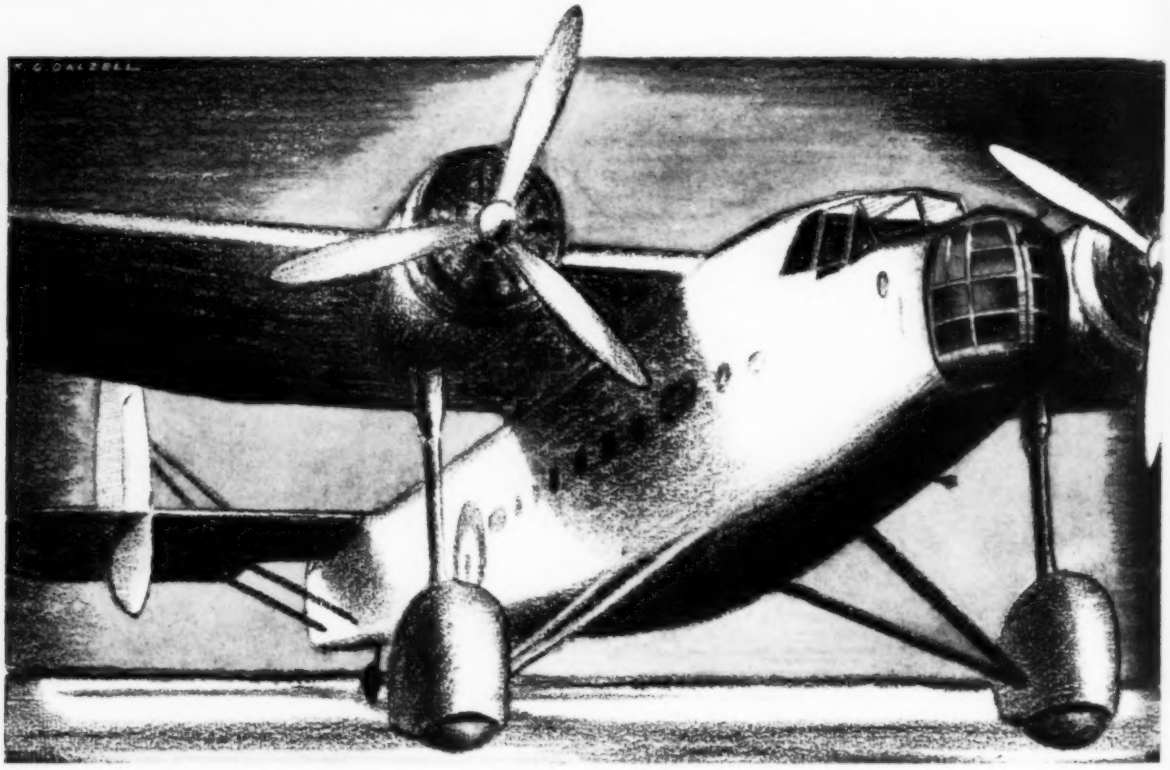
OFFICIAL ORGAN OF THE ROYAL AERO CLUB



Blackburn "SKUA"

The Blackburn 'SKUA' Fighter Dive Bomber takes its name from the Skua seabird, remarkable for its tremendous strength, great speed, acceleration and formidable dive when attacking its prey.

NOW IN QUANTITY PRODUCTION FOR THE R.A.F.



"Bristol"
Bombay

BOMBER - TRANSPORT or TROOP CARRIER

An all-metal high-performance aircraft fitted with two "Bristol" Pegasus engines

THE BRISTOL AEROPLANE CO. LTD., FILTON, BRISTOL

FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

Editor C. M. POULSEN

Managing Editor G. GEOFFREY SMITH

Chief Photographer JOHN YOXALL

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1

Telegrams: Truditur, Sedist, London. Telephone: Waterloo 3333 (50 lines).

8-10, CORPORATION ST., COVENTRY. Telegrams: Autocar, Coventry. Telephone: Coventry 5210.

GUILDHALL BUILDINGS, NAVIGATION ST., BIRMINGHAM, 2. Telegrams: Autopress, Birmingham. Telephone: Midland 2971.

260, DEANSGATE, MANCHESTER, 3. Telegrams: Iliffe, Manchester. Telephone: Blackfriars 4412.

26B, RENFIELD ST., GLASGOW, C.2. Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

SUBSCRIPTION RATES: Home and Canada: Year, £1 13 0. 6 months, 16s. 6d. 3 months, 8s. 6d. Other Countries: Year, £1 16 0. 6 months, 18s. 0d. 3 months, 9s. 0d.

No. 1546. Vol. XXXIV. AUGUST 11, 1938. Thursdays, Price 6d.

The Outlook

The Air Exercises

THE weather was just about as unkind as it could be to the large-scale Air Exercises held last week. The main object of the great show was to give practice in working together to all the heterogeneous elements which go to make up our air defence system. Fog and low cloud intervened and accordingly the amount of practice given was seriously curtailed. The worst sufferers in that respect were the crews of the T.A. searchlights. They had come to their camps in great numbers and for the Exercise they had been distributed about the country in little groups of a few men with a projector and three tents, camped in fields, each about a couple of miles away from the next post.

From observation on previous Air Exercises it appears that while each crew of the searchlight battalions is well trained, a great deal more practice is needed in combined operations. In past years there has been a tendency, when one light has caught a bomber in its beam, for every light within sight to dash at that same bomber with an almost audible shout of "Me too." That is a waste of energy, for it is quite sufficient for three beams to concentrate on one bomber. If others join in, it means that some other bomber has a good chance of sneaking through unobserved. Lots of drill on a large scale is what is wanted to correct that tendency. It was hoped that these Exercises would provide such practice.

However, the weather conditions cut down the volume of raiding to such an extent that some of the searchlights got little or no practice in spotting bombers. Things were so bad in this respect that on the Sunday morning, when the bombers were recalled at 01.30, the fighters were directed to continue flying for another three hours so as to give the searchlight crews some practice. Incidentally this resulted in the loss of four Demons, which could find no fog-free aerodrome in all Lincolnshire on which to land, and it was indeed fortunate that none of the crews was killed or hurt.

Obviously the searchlight crews were unable to obtain the same realistic practice which they would have had if a stream of hostile bombers had been coming overhead, varied at times by friendly bombers returning from a raid on Eastland.

Weather and Tactics

BOTH attack and defence were hampered by the bad weather, and it will probably take the staffs of the Bomber and Fighter Commands some time to collate all the results and extract the lessons which the bad weather taught. The outside observer can only note a few points.

In the first place, the huge mass attack on Westland had to be curtailed. Bombers require a lot of special circumstances if their work is to be effective. They like a certain amount of cloud to hide them as they approach and again as they retreat to the coast. At the same time they must be able to see their targets if they are to make good shooting. During these exercises some raids were able to get through and bomb their targets without being intercepted; but the scale of raiding was very modest.

The fighters in consequence had fewer raids to find, but more difficulty in finding them. It is claimed that they intercepted the majority, but precise figures have not been published. It must be remembered that the final stage of interception depends on the sharp eyes of the fighter pilots. The ground organisation can say where a raid is heading, and at what height. The Fighter Group concerned can order a certain squadron to patrol on that line and at that height, but then everything depends on the fighters seeing the bombers. Misty weather will make this difficult.

Given practice, fighter pilots acquire very sharp sight, and can spot aircraft in the air when to the ordinary untrained man they are completely invisible. But experience is the one thing which our splendid Flying Training Schools cannot give to new pilots, and most of the men who were flying on these exercises had not joined the R.A.F. when air exercises were held last year. Next summer pilots as a body will be far more experienced.

Make-believe

THE absence of real lethal weapons in exercises tells more heavily in favour of the attack than of the defence. Some of the bombers showed a great contempt for the balloon barrage, which was theoretically flying at a great height in a position to protect the London area. Though the gunners took all steps up to setting the shell fuses no "Archies" came hurtling up to shake the nerves of the bombers, and possibly break up their formation—let alone pointing them out to the fighter patrols.

The bombers may reply that if they dropped real bombs they would shake up the defence; but even the imaginary nature of the bombs may sometimes be an advantage to the attack. A good deal of use seems to have been made of low-flying attacks, with which fighters find it difficult to deal; but if the bombs were real the raiders would have to be careful not to blow up some of their own formation. Still, the pilots of the Bomber Command deserve congratulation for the determination they showed.

The most satisfactory feature of these disappointing Exercises is the work of the Observer Corps. It seems to have done right well and thoroughly to have deserved the complimentary message from the Secretary of State for Air.

Something Wrong

WHETHER or not wireless direction-finding can be successfully and safely used in war time, the fact remains that it should at least be used in emergency peace time circumstances by bomber crews and others who must fly by night in all weathers.

We know that quite shortly a number of Service aerodromes will be equipped with ultra-short-wave blind-approach beacons, but even with such aids, which are available over comparatively short ranges, the use of ground or air direction-finding facilities is still an essential part of the business of safe navigation in bad weather. Everybody knows, too, that wireless is used quite extensively for giving instructions and general information, but if a pilot has been flying about over fog or low cloud for a long time in an endeavour to pick out some light or landmark, he is not helped very much, for instance, by the simple information that another aerodrome somewhere else is quite fit for use. Unless he has plotted his movements very carefully during the period of search, he can only have a very general idea of the course on which he must fly. Direction-finding radio in these circumstances is essential. It is significant that the Oxford trainer has both two-way radio and a D/F loop.

Not that direction-finding is by any means a cure for all bad-weather evils, but it at least acts as a basic guide and can, with constant practice, actually be used for the final approach into an aerodrome where the visibility at ground level is not too seriously restricted. For years the early morning newspaper pilots have made good use of the "ZZ" system, which is nothing more than a development of the straightforward approach on successive bearings.

In the Service, generally speaking, one finds an indifference, which, to say the least of it, is disturbing, about this particular and essential use of wireless assistance. There are, of course, direction-finding stations at some Service aerodromes, and these are presumably available for use in emergencies. It is possible, however, that neither the operating staffs nor the pilots have had sufficient practice to be able to make the best of such facilities. At any rate, the fact remains that their use is for some reason very limited and that lives are occasionally lost because pilots are not able, or are unwilling, to obtain a bearing and so be assisted in reaching better weather.

There appears to be an impression in the Service that when aerodromes and machines are equipped with Lorenz transmitters and receivers most of their troubles will be over. This is certainly not the case, since the range of the beam at reasonable altitudes is comparatively short and it is still necessary to be led, one way or another, to the area of possible reception.

If there is one important lesson which the Exercises have taught it is that they should not again be attempted on such a large scale until means are ready and operators practised to provide essential homing and position-finding facilities for use in emergencies only. The climate cannot be adjusted to suit war or rumours of war, and the conditions were, in fact, just those best designed to test equipment and training. On the whole, the pilots have come through magnificently and it is rather the fault of the system in general if there have been losses of machines, and even of men, which might have been avoided by a relaxation of the rules of make-believe.

The Freedom of the Air

READERS of a certain London daily newspaper last week must have received a curious picture of the attitude of the Royal Dutch Air Lines (K.L.M.), having been told that the company defied the Air Ministry's "ban" on civil aircraft in the Exercise zone. The truth of the matter is, of course, that the K.L.M. machines defied no ban, trespassed in no prohibited area, and entered no forbidden zone.

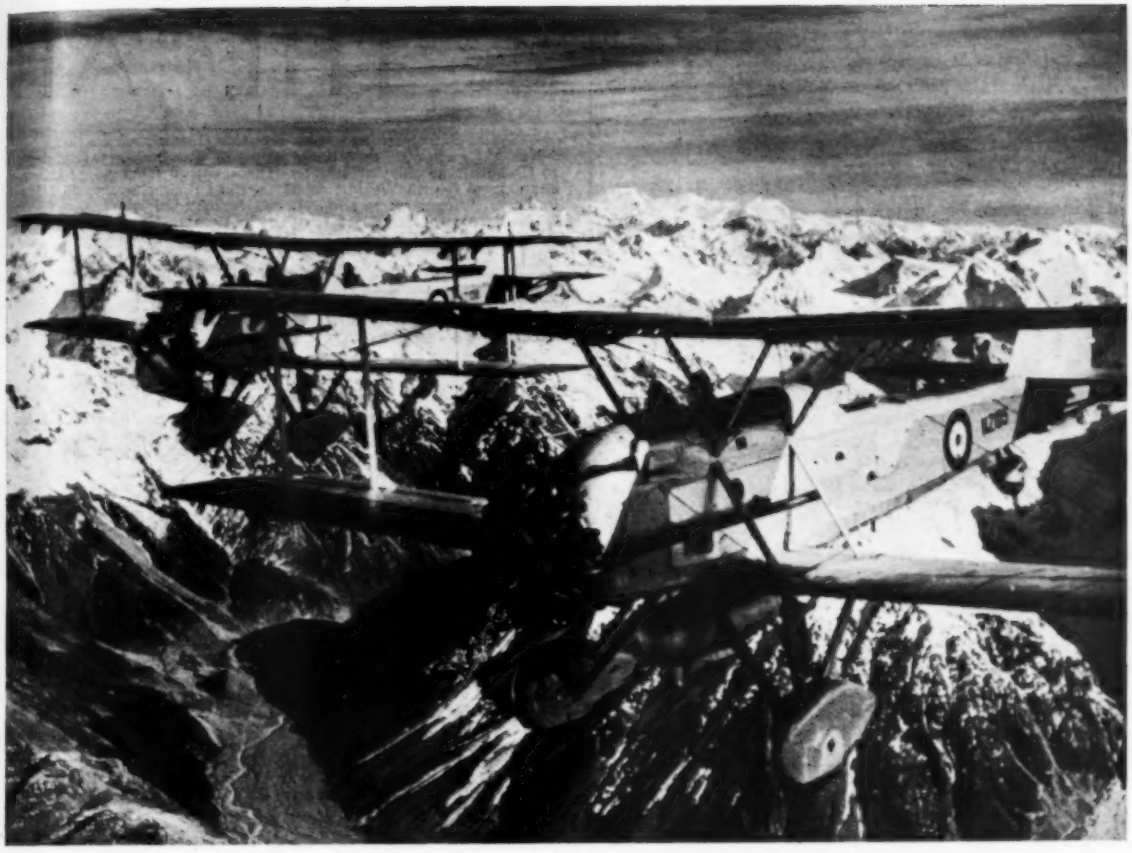
The position, as should be obvious to any average intelligence, was that in addition to the prohibited area bounded by territorial waters there was a zone in the North Sea in which, operators of commercial aircraft were informed, considerable numbers of R.A.F. machines were likely to be encountered during the air exercises. This area was not prohibited in any sense of the word (extra-territorial waters cannot be closed by any nation) and operating companies were advised to keep clear of it, or alternatively to keep a particularly sharp look-out.

It is not very surprising that the Dutch, a seafaring and airfaring nation, should feel concerned about the freedom of both those elements. The K.L.M. thanked the authorities for the warning and stated that their merchant ships of the air, upon their lawful occasions, would follow specified routes across the North Sea. The company was probably quite right—it was certainly justified—in ignoring the advice to keep out of the zone above the free seas. The fact that it laid down its official route but made the use of that route subject to weather conditions, extra traffic congestion and general safety, seems to show that the freedom of the air was undoubtedly preserved. That is all to the good. If no company had decided to fly across this war zone, situated as it was over extra-territorial waters, some other Power might have staged, at a later date, air manœuvres on an even larger scale and might conceivably have attempted to close the free skies above the free seas to the commercial aeroplanes of the nations. It was a pity, however, that an air operating company should have had its actions, correct as they undoubtedly were, represented as defiance of a "ban" which did not and could not exist.

To America at 270 m.p.h.

THAT construction is to be started soon of a landplane upper component of a composite aircraft was disclosed by Major Mayo last Monday in a lecture. This was foreshadowed in *Flight* on July 28, and it is interesting to learn that Major Mayo expects of the landplane version a top speed of 300 m.p.h. and a cruising speed of 270 m.p.h. As he has stated that the floats of *Mercury* slow down that machine by some 50 m.p.h. it may be taken that the new upper component will not be a mere landplane version of *Mercury* but will have certain new features. It is to be expected that the wing loading will be increased, for example. Tests with *Mercury* and *Maia* indicated that there are no technical difficulties in doing this, and a great gain in top speed and cruising speed may be anticipated.

DIARY OF FORTHCOMING EVENTS—PAGE 125



PUTTING THEIR TRUST IN PEGASUS: Vickers Vildebeestes of the Royal New Zealand Air Force flying at 13,000ft. over no sort of country for forced landings. The scene is the Southern Alps of New Zealand and the temperature, according to the photographer, was 10 deg. below zero. Beneath the nearest machine is a long-range tank.

Private Flying "Liberated"

WHAT our worthy contemporary *Les Ailes* describes as un geste heureux of the new French Air Minister, M. Guy La Chambre, was the new decree contained in the Journal Officiel of July 29, which aims at liberating French private flying from the hampering influence of official interference. According to the new order, French light aircraft will, from November 1 next, when the order takes effect, be exempt from the usual conditions which have hitherto governed the issue of a Certificate of Airworthiness.

Two classes of certificate will come into force, to be known respectively as CNRA and CNRT. The detail regulations of the latter are still under consideration, but in the meantime machines in this category will be governed by existing conditions, with the important exception that they will not be required to have dual ignition.

The CNRA certificate will afford almost complete freedom to constructors, but the possession of this certificate will not permit the machines to be flown outside France. Upper limits on engine capacity are imposed: 9 litres for single-seaters and 15 litres for multi-seaters. Aircraft with larger engines will not be eligible for the CNRA certificate.

Certain restrictions there are, to be sure, and it does not by any means follow that they will afford any safeguard. For example, the owner (yes, the order says owner, not constructor) must, before he can get his certificate for the machine, supply a certificate from the commandant of a public aerodrome to the effect that the machine has flown in a satisfactory manner for at least fifteen hours, including at least 50 landings, and the commandant must have satisfied himself that the same engine and airscrew are used throughout. This applies to prototypes. For production aircraft of the same type, a certificate from some insurance company will be accepted.

We can think of one or two "commandants of public aerodromes" in this country to whom we would not like to entrust the responsibility of deciding whether or not an aeroplane had flown for fifteen hours "in a satisfactory manner."

La Prime d'Essence

NOT content with leaving the judgment of an aeroplane's flying qualities to the commandant of a public aerodrome, the French Air Minister has granted a rebate of one franc per litre on petrol used in private aircraft, up to an engine capacity of 250 h.p. This rebate will be collected by the flying clubs, from whom, in turn, the private owners will buy their petrol.

Many times and oft in this country have we tried to get a rebate on the petrol tax, but the attempts have always failed. The last time was when Lord Swinton stated, just before his retirement, that it was not practicable to grant a rebate. His argument, rather a feeble one, was that once one began to grant exemptions from the petrol tax to one section of the community, there were at once many others with equally valid claims to be considered.

There is a good deal to say in favour of the French system. No other form of transport uses as much petrol in proportion to the load carried, and the petrol bill forms a very large item on the private owner's annual expenses sheet. Perhaps Sir Kingsley Wood, who has already shown so much willingness to encourage flying for the indigent indigenes will reconsider the matter of a remittance of some part of the petrol tax for private flyers.

We would not go so far as to say that Sir Kingsley should follow the example of M. Guy La Chambre in making commandants of public aerodromes the sole judges of an aeroplane's safety characteristics, but what about "implementing" the Gorell Report?

This map shows the operational area and the various stations engaged

THE AIR EX

ON Thursday morning last, at 10 a.m., the Royal Air Force started the largest-scale exercises ever held in this country. Nearly 900 aircraft were engaged, as well as about 17,000 men of the Territorial Army and between 3,000 and 4,000 of the Observer Corps. The exercises were designed to continue for forty-eight hours consecutively, whereas in recent years there has been an armistice from morning to evening each day while the civilian elements went to earn their livings in the normal way. This time the 1st and 2nd A.A. Divisions of the T.A. were in camp for their annual training, and so were able to give their whole time to the exercises. As for the Observer Corps, many members postponed their holidays so as to be able to man their posts, a patriotic action such as we should have expected from this admirable corps.

The general idea was the well-worn one of a war between Eastland (the enemy) and Westland, i.e., Great Britain. The area of operations is given on the accompanying map. This year attention was concentrated on the East Coast, and the scheme envisaged the protection not of London only, but of the Midlands and North as well. The searchlights were scattered thickly all the way from the Thames up to Lincoln. It was reassuring to be told that the production of searchlights has recently been going on at a greater pace than ever before, and also that the War Office has at its disposal a good many more lights than were used in this exercise; furthermore, that next year there will, without doubt, be enough lights to cover a much greater area than was covered last week. It would therefore be wrong to talk of a shortage of searchlights leaving the South Coast unprotected.

The following were the forces engaged:—

Westland forces under Air Chief Marshal Sir Hugh Dowding, G.C.V.O., K.C.B., C.M.G., Air Officer Commanding-in-Chief the Fighter Command, had a total strength of about 470 aircraft.

The composition of the Westland force was as follows:—

Fighter Squadrons and their Exercise Operational Stations:

No. 3 (Northolt); 19 (Duxford); 23 (Wittering); 25 (Debden); 29 (Debden); 32 (Biggin Hill); 41 (Duxford); 46 (Digby); 54 (Hornchurch); 56 (North Weald); 64 (Digby); 65 (Hornchurch); 66 (Duxford); 72 (Wittering); 73 (Digby); 74 (Hornchurch); 79 (Biggin Hill); 85 (Debden); 87 (Debden); 111 (Northolt); 151 (North Weald); 213 (Wittering); 601 (Biggin Hill); 604 (North Weald).

Bomber Squadrons and their Exercise Operational Stations:

No. 9 (Stradishall); 21 (Waddington); 37 (Feltwell); 38 (Marham); 49 (Scampton); 50 (Waddington); 75 (Honington); 83 (Scampton); 99 (Mildenhall); 107 (Scampton); 115 (Marham); 149 (Mildenhall); 214 (Feltwell); 215 (Honington).

Ground Forces:

The anti-aircraft units of the 1st Anti-Aircraft Division, T.A., were under the command of Major General Sir Frederick A. Pile, Bt., C.B., D.S.O., M.C., and of the 2nd Anti-Aircraft Division, T.A., under the command of Major General J. M. R. Harrison, C.B., D.S.O.

The batteries and searchlight companies engaged were as follows:—

1st A.A. Division. T.A.

55th (Kent) A.A. Bde., R.A., T.A.; 58th (Kent) A.A. Bde., R.A., T.A.; 59th (The Essex Reg.) A.A. Bde., R.A., T.A.; 61st (Finsbury Rifles) A.A. Bde., R.A., T.A.; 26th (London Electrical Engineers) Bn., R.E., T.A.; 27th (London Electrical Engineers) Bn., R.E., T.A.; 28th (Essex) Bn., R.E., T.A.; 29th (Kent) Bn., R.E., T.A.; 31st (City of London Rifles) Bn., R.E., T.A.; 32nd (7th City of London) Bn., R.E., T.A.; 33rd (St. Pancras) Bn., R.E., T.A.; 36th (Middlesex) Bn., R.E., T.A.; 1st A.A. Divisional Signals; 1st A.A. Divisional R.A.S.C.

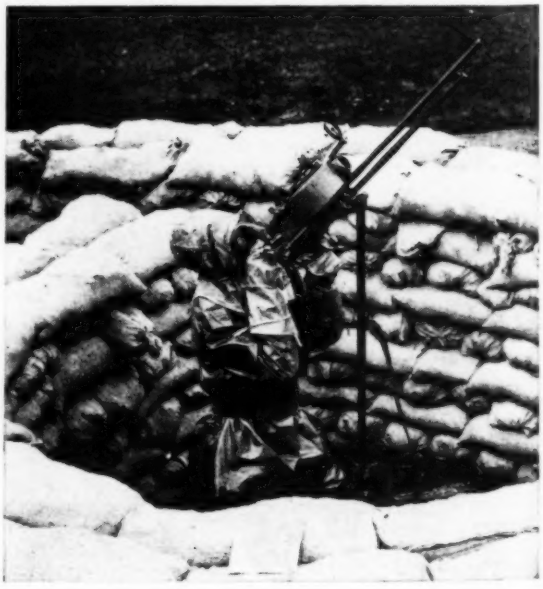
2nd A.A. Division, T.A.

30th (The Lancashire Fusiliers) A.A. Bn., R.E., T.A.; 40th (The Sherwood Foresters) A.A. Bn., R.E., T.A.; 41st (5th North Staffs Regiment) A.A. Bn., R.E., T.A.; 42nd (The Robin Hoods, Sherwood Foresters) A.A. Bn., R.E., T.A.; 43rd (5th Duke of Wellington's Regt.) A.A. Bn., R.E., T.A.; 44th (The Leicestershire Regt.) A.A. Bn., R.E., T.A.; 46th (The Lincolnshire Regt.) A.A. Bn., R.E., T.A.; 47th (The Durham Light Infantry) A.A. Bn., R.E., T.A.; 2nd A.A. Divisional R.A.S.C.

Eastland forces, under Air Chief Marshal Sir Edgar Ludlow-Hewitt, K.C.B., C.M.G., D.S.O., M.C., Air Officer Commanding-in-Chief the Bomber Command, had a total strength of 475 aircraft. Units were:—

The Raiding Bomber Squadrons and their Stations were as follows:

No. 7 (Finningley); 10 (Dishforth); 12 (Andover); 15 (Abingdon); 18 (Upper Heyford); 35 (Cottesmore); 44 (Bicester); 51 (Linton-on-Ouse); 52 (Upwood); 57 (Upper Heyford); 58 (Linton-on-Ouse); 61



Using a camera gun from a sandbag emplacement at Upwood aerodrome. Gas alarms were part of the exercise at a number of stations.

IR EXERCISES

Last Week's Large-scale Test of Britain's Defences : Weather Interferes with Operations : Impressions While Flying in Raiding Aircraft by Day and Night

"Flight" photograph.

(Hemswell); 62 (Cranfield); 63 (Upwood); 76 (Finningley); 77 (Driffield); 78 (Dishforth); 82 (Cranfield); 88 (Boscombe Down); 90 (Bicester); 98 (Hucknall); 104 (Bassingbourne); 105 (Harwell); 108 (Bassingbourne); 114 (Wyton); 139 (Wyton); 142 (Andover); 144 (Hemswell); 206 (Bircham Newton); 207 (Cottesmore); 217 (Tangmere); 218 (Boscombe Down); 220 (Bircham Newton); 224 (Gosport); 226 (Harwell); 233 (Gosport); 269 (Tangmere).

The purpose of having friendly bombers on the Westland side was to practise the Observers and Territorials in distinguishing between friends and foes. The task of the friendly bombers was to fly in over the coast as if returning from a raid on Eastland. By night they would do so with their lights on, being over their homeland. Moreover, the types of the friendly bombers were different from those of the raiders. All the Eastland bombers were of post-expansion types, such as Blenheims and Battles.

The hostile bombers, of course, had to start from aerodromes in this country and fly out to sea before they began to raid, and after a raid they had to cross the coast out to sea again before going home. By night they made the raid without lights, only showing them if a collision seemed imminent, but before starting the raid and after finishing it they could behave as though they were friendly bombers, and show lights if it were night time. The fighters always kept their lights on at night.

The object of the Exercises was to practise all the various elements in working together. There was no question of one side or the other winning the war. Consequently, there were several artificial elements. Sir Edgar Ludlow-Hewitt was not free to use what bombing tactics might seem best to him. His main job was to give practice to all the Observer posts and Territorials; and so he had to distribute his raids along the defended area. Of course, he was free to do his best to dodge the fighter squadrons, but he had to play the game with the ground units.

No Casualties Assessed

As in previous years, no machines were put out of action as casualties. All the bombers flew on, whether they would have been shot down or not, and so, for this once, Earl Baldwin's dictum was verified, and the bomber (provided he could find his way) always got through.

In real war two things would be demanded of the fighters, (1) interceptions and (2) casualties. These exercises did to some extent test the probability of making interceptions; they could not test the fighters' power of inflicting casualties. Still, at the outset of the exercises, an officer of high rank expressed an emphatic opinion that the modern eight-gun fighter had an overwhelming superiority in air combat over any bomber, and he uttered the warning that we must always be looking ahead and planning ahead so that our fighters should keep a superiority over future improved bombers. That being so, he said that he did not think very much of wearing gas masks and living in cellars, though certainly A.R.P. were desirable.

There were other unrealities in the Exercises. Theoretically, the Balloon Barrage Group was out, flying its balloons at a great height, and placing them so as to shield London. Actually, this embryo body could not be present.

The anti-aircraft guns were not manned, for they could not fire any sort of shell at the bombers. They get their firing practice at Watchet and other similar camps, against drogues and Queen Bees. But the gunners were ordered to use their range-finders and predictors, and to carry things up to the point of issuing aiming orders and setting the shell fuses.

A.R.P. could not well neglect these large-scale Exercises, and it was arranged for warnings to be sounded at various places when news of a raid came in from the Observer Corps, and likewise the "All Clear" was sounded when the same invaluable body gave permission. Some towns also staged black-outs, but that had to be arranged secretly, so that the Eastland staff might not get advanced warning of the alterations in the appearance of the country by night.

There was one novelty in communications in these Exercises. The gunners and searchlight posts did not send in raid reports to H.Q. Such reports only came from the Observer Corps. The Fighter Command now places such reliance on that Corps that it dispenses with other reports, even though the Territorials have more accurate instruments than those of the Observers. Still, when the guns begin to fire or the sappers to expose beams, they are broadcasting their own information to the fighter patrols in an unmistakable manner, and it is the fighters who need the most accurate information, and need it quick.

The Course of the Raiding

The weather was very unkind to the Exercises and robbed many units of the practice which would have been so valuable to them. Things were due to start at 10.00 on Friday, but, owing to low cloud throughout the area, the time was postponed till 14.00 hours. But Sir Edgar Ludlow-Hewitt very much curtailed the scale of the raiding, and the mass attacks which were expected to assail the whole of the East Coast did not come up to expectations. Things began to liven up in the late afternoon and evening, and some fifty raids were reported. Some of these were made by only small formations of three machines. Among the incidents were a low-flying attack on Swindon, and another by bombers working individually on Wittering. In bad visibility it would be harder for the defence to intercept all of a number of single machines than a whole squadron, though, of course, the single bomber caught by fighters would have little chance of surviving. Heavy bombers raided Sheffield, and Leeds and Leicester also suffered, as did Guildford and Tangmere and several aerodromes.

The majority of these raids were intercepted, but obviously the murk handicapped the defence. It seems that the Observer Corps came very well out of the day's work, and reported all the raids.

On Friday night fog grew thick, and a number of raids were cancelled, while other bombers were recalled after they had started. At 08.30 on Saturday morning an armistice was declared, which was extended up to 14.00 hours. Then two large raids by eighteen and twelve bombers respectively set out for London, one coming in over Essex

and the other over Kent. Both were intercepted, one near Braintree and the other near Sevenoaks. They were considered to have suffered heavily.

During the day Mr. Hore-Belisha, the War Minister, visited the Operations room at the Fighter Command H.Q. and the H.Q. of No. 11 (Fighter) Group at Uxbridge. The Air Minister, Sir Kingsley Wood, also went round, and was at Hornchurch at 17.00 when twenty-two Fairey Battles stole in on a low-flying raid, below the roof level of the hangars, at 250 m.p.h., and proceeded to obliterate the Air Minister and his staff. The question remains whether they would not have obliterated a good many of their own number by bombing at such a low height. Sir Kingsley went on to Fighter Command H.Q., and there met with another adventure, for three A.W. Whitleys sought his blood. They had no luck, however, for some trusty Hurricanes intercepted them just before they reached their objective, and no doubt the eight-gun fighters shattered them effectively.

During the afternoon it was estimated that some 66 per cent. of the raids were intercepted. Of course, the raids went on, and Battles got home on Boscombe Down; two Wellesleys, flying low, on Driffield; Blenheims in small formations on Bassingbourn, Cranfield and Wyton; Battles on Abingdon and Harwell; and Blenheims on the railway cutting at Great Rissington.

During Saturday night the Eastland bombers, ignoring the risks of the imaginary balloon barrage, attacked London in a series of small formations. The searchlights were busy, and many interceptions were made. After midnight fog descended heavily over the whole area, spreading in from the sea. It brought tragedy in its train. At 01.30 on Sunday morning all the bombers were recalled to their home stations. One Harrow, from No. 37 (B.) Squadron, Feltwell, evidently came down through the fog to see where it was, and hit a tree at Great Barton, near Bury St. Edmund's Suffolk. It crashed and burst into flames, and all the five on board lost their lives. It may be noted that the pilot held the rank of Flying Officer, and therefore had plenty of experience. Another tragedy befell a Battle of No. 88 (B.) Squadron from Boscombe Down, which wandered about for some five hours after the recall had been given and finally turned over when landing on rough ground near Braintree, Essex. The pilot, a Flight Lieutenant, was slightly injured, but his air gunner was killed.

The fighters were not recalled at the same time as the bombers, but stayed up till 04.50 in order to give practice to some of the searchlights. The curtailment of the raids had left some of the T.A. sappers without any chance of spotting Eastland raiders, and it would have been most undesirable for them to feel that they had wasted their time. But the result was that four Demons found all the aerodromes in their part of Lincolnshire completely blotted out by fog. They flew round until their petrol was exhausted, and then the crews of three of them jumped with their parachutes and landed safely. The pilot of the fourth tried to get down on Digby Aerodrome but crashed in a field beside it. Neither he nor his gunner was injured.

These very disappointing exercises came to an end at 14.15 on Sunday, a day of continuous rain in London, when no raiding was possible.

Sir Kingsley Wood sent the following message to the Commandant of the Observer Corps:—

"I have seen the Observer Corps at work during this Exercise, and have also been able to examine the results of their work at headquarters, and I am much impressed with the great value of their work, which is quite indispensable to the air defence of this country.

"I wish to express my appreciation of the spirit and the efficiency with which this work is undertaken voluntarily by members of the Corps all over the country."

Hereafter follow some personal impressions by members of the staff of *Flight*, who were privileged to fly on raids by day and night.

RAIDING IN AN EASTLAND BLENHEIM

AT Wyton, near Huntingdon, on Friday morning one found a scene that, with minor variations, must have been typical of that at almost any other station in the Exercise area.

At 08.30 hours the machines—in this case Bristol Blenheims of Nos. 139 (B.) and 114 (B.) Squadrons (Commanding Officers, Sqn. Ldr. L. W. Dickens and Sqr. Ldr. W. L. Freebody, A.F.C., respectively)—taxied out from the big hangars to become mere wraiths on an aerodrome blanketed by a warm and clammy mist that merged imperceptibly into low cloud. Then, but for the occasional pulsating roar of a pair of Mercuries being run up, peace descended. Obviously the war could not start until the weather assumed a brighter face.

Indoors there was more activity. Around a big table in the crew-room, littered with maps and C.D.C.s, a score of navigators, the majority of them sergeants and corporals, worked out courses. Much cheerful chatter and an occasional imprecation as a problem refused to resolve itself suggested a pre-breakfast prep. period at school, and a roughly drawn diagram on a blackboard heightened the illusion. In his office upstairs a harassed but cheerful Assistant Adjutant—incidentally a retired Army officer—wrestled with a spate of operation orders which constantly threatened to overwhelm a daily routine already sadly upset by the hostilities.

Not until after noon did the blanket lift sufficiently to reveal the trees on the far side of the aerodrome and the slim, dark Blenheims ranged against the boundary among bell tents, the very presence of which suggested that something out of the ordinary was afoot.

Theoretically, of course, these bombers were not sitting on Huntingdon turf at all. They were being readied by the sinister soldiery of Eastland, that dank and dismal territory founded on the sand-banks of the North Sea. Certain other types were considered to be Westland bombers on their way out to deliver a heavy load of *quid pro quo* upon the heads of the Eastlanders. As such, they would receive the "pass, friend," from the defending forces between Wyton and the coast. Only when well out to sea would these aerial Jekyll and Hydes assume their mantle of villainy to turn and rend the country they had left. We ourselves were considered a sort of "dead ball" until we turned about.

It sounds a little complicated, but the umpires, no doubt, understood it. Which reminds us of the fact that the sadly belated zero time of 15.11 hours at Wyton caused a drawing of stumps alongside our Blenheims, and a team of budding Bradmans turned to with a will to get us on our way.

Crews listened seriously to a final caution on the Exercise safety rules framed for just such visibility conditions as these, then dispersed to their machines. There was to be no formation work; instead, we were to take-off at three-minute intervals.

Familiarity, no doubt, breeds ability, but one refuses to believe that any amount of familiarity can ever render easy the job of insinuating one's self into a Blenheim when encumbered with a Sidcot suit, life-saving jacket (for use in case of a forced landing on—or in—an Eastland aerodrome) and parachute harness, though the Irvin observer-type chest pack is thankfully unhooked and stowed away as soon as we are on board.

We find ourselves consigned to what is known as "the well"—the circular space in the centre section. The name is not quite apt, for in a common or pussy-type well daylight can be seen in one direction only. From the Blenheim's well it can be perceived in two directions—forward, between the heads of the pilot and navigator, and aft, where the radiance of the rear turret is shed downwards over the rear view of the air-gunner-*cum*-W/T-operator on his revolving seat.

Actually, experiment proved that, at the risk of an occasional crack on the head in bumps, the well-dweller can see quite a lot of the countryside forward. For the pilot and his right-hand man visibility in all forward and side directions is obviously excellent, and to one unaccustomed to joy-riding in modern bombers, there is the oddest satisfaction in watching the countryside slip along below the bomb-aimer's window in the nose. And how it slips along!

So far as can be seen and felt, we are air-borne after an incredibly short run. A climb to the 800ft. cloud-base (or haze ceiling), a change of airscrew pitch that is felt rather than heard, and we settle down to a nice, easy 210 m.p.h. During this period one has been impressed by the apparent facility and speed with which the Blenheim pilot can deal with his flap, undercarriage, trimming and other adjustments. It is in quite startling contrast to the laborious wheel-winding, pump-handling and tap-twiddling which we have encountered in more than one commercial aeroplane.

We fly a short leg N.N.E. to Upwood aerodrome, then turn eastward for the coast, climbing gradually to 4,000ft. through the patchy mist and cloud. A clear and sunlit coastline shows up with almost indecent haste, though we are merely pottering along with a modest 2,000 r.p.m. on the indicators.

We spend ten minutes at sea doing a Jekyll and Hyde act, then turn back purposefully for our first target—Milden-

hall. Soon after we go inland, three of those *raræ aves*, Fairey Hendons, cross our path, flying south-east on some errand doubtless as important as our own.

A few minutes more, then the navigator kneels forward with his oblique camera at the ready. Down goes the Blenheim's nose in a shallow dive-bombing attack, and the well-remembered hangars of Mildenhall swing into view ahead, loom large before us, and are instantly replaced by a watery sun as 1,600 h.p. hauls us up into the safety of the mist-veil.

The Blenheim thunders on westwards, for its next target is in the vital Midland areas. The murk thickens, and with nothing to watch one ruminates on the *décor* of the grey-green interior; on what an awful lot of things, fixed and detachable, from Essex extinguishers to oxygen bottles, are clipped to the fuselage wall of a modern military aeroplane; on the nicely stencilled names saying where each one of the things lives, and what mustn't be done with it; on a roughly pencilled note, "U-bolt," with an arrow pointing to the head of one of a row of identical screw-heads; and on the general perfection of the interior metal-work, even where a burred edge would not be of the slightest moment, aerodynamically or otherwise. Actually, this particular Blenheim was an early made-by-hand-one-at-a-time product; yet another which we examined later, born by mass-production out of expansion, showed the same conscientious workmanship, with only an occasional wandering paint-spray mark to betray haste.

One could not truthfully call the Blenheim a quiet aeroplane. Admittedly the pilot had his side-window open in order that he might see better through the dirty atmosphere; but there was an elusive, high-pitched whistling scream that tried the ears on a long trip. Perhaps it was airscrew noise; more probably, sheer 240 m.p.h. gale.

But to return to the war. We fly a dog-leg course *via* Kenilworth, so as to approach our Midland target, a factory at Castle Bromwich, from a direction calculated to surprise the defenders. The Blenheim approaches the target over a thin film of low cloud. Down goes the nose. A familiar aerodrome and the words "British Industries Fair" slide across the windows at an improbable angle. A satisfied thumbs-up signal is exchanged among the crew, and again we escape upwards into the cloud-film.

And it goes on; eastward once more, up to 6,000ft. this time, so that one at last begins to appreciate one's Sidcot; out over the North Sea again, *via* the yacht-studded Norfolk Broads, and inland to attack Feltwell aerodrome, the air gunner this time recording our decimation of the Harrows round the aerodrome boundary by means of the Williamson vertical camera; then on towards the hazy Midlands for another attack on the Castle Bromwich target. And at last home to dinner, our own and each following Blenheim whistling in to a thistle-down landing on Wyton's receptive surface.

The flight was an experience which, frankly, impressed us deeply with the potentialities of the fast bomber for tip-and-run raiding, or any other kind for that matter. At the same time, one must bear in mind the unreality of raiding over one's own territory, in spite (in this instance) of our navigator's obvious skill. We were, of course, primarily there as practice material for the defences. For all we know, we may have have been shot down by A.A. fire. Perhaps we were even reported by fighters. But we saw not a sign of one. The only objects that attacked us were the Hillmorton radio masts, which reared themselves up quite an indecently long way in order to do so. R. E. C.

At Bomber Command H.Q.: The C.-in-C., Air Chief Marshal Sir Edgar Ludlow-Hewitt, K.C.B., C.M.G., D.S.O., M.C. (right), with some of his staff. The other names, from left to right, are: Group Capt. J. K. Summers, M.C., head of the navigation section of the Command staff; Air Commodore Sydney Smith, O.B.E., Senior Staff Officer; Wing Com. V. F. Groom, D.F.C.; and (with case) Group Capt. N. H. Bottomley, C.I.E., D.S.O., A.F.C.

"Flight" photograph.

A sound-locator post in Essex, operated by men of the 32nd Battn. Royal Engineers (T.A.). The other photograph shows a gas alarm post at Tangmere Aerodrome, Sussex; the affair on the right is not a stand for the gong-music, but a chemically treated sheet which will change colour in the presence of gas.

WITH THE "FRIENDLY" BOMBERS

A Night Raid on Eastland with a Harrow: Weather Problems

BALDLY stated on paper, there might appear to be a certain considerable appearance of unreality about a bombing raid in which the machines must first fly out to sea and then attack objectives which, for the most part, are brightly lit. In actual practice such a raid can be very real indeed—particularly when the weather over parts of the country is far from perfect. Assigned, as a journalistically interested observer, to Feltwell aerodrome, near Thetford, I was asked to report there at 7 p.m. to join a squadron of No. 3 (Bomber) Group which was among those in the defending forces on the side of the mythical Westland.

These defending forces consisted mainly and rather naturally of fighter squadrons, but fourteen bomber squadrons were included, and the machines, for practice purposes, attacked objectives in the south of England which may be considered as being in enemy territory—munition factories and so forth working day and night in the interests of that other mythical country, Eastland.

Duly, at 19.20 hrs. and garbed in the usual clutter made up of a flying suit, a life-saving jacket and a parachute harness, I climbed into a Handley Page Harrow of No. 214 (B) Squadron. At ground level the heat was intense, and after a quarter-mile walk to the waiting and warmed-up machines one felt like a mobile turkish bath. However, we were due to fly for quite a long time at any altitude up to 10,000ft., and, though the Harrow has a heating system, the winter-suiting was appreciated as night fell when flying at 8,000ft. or so over the North Sea.

Our orders were to fly over to Orfordness, then eighty miles out to sea to within a short distance of the Dutch coast, back to Orfordness, and south to destroy some bully-beef factory or other in Tunbridge Wells. Thereafter we were to fly out from North Foreland, back to Tunbridge Wells again and home. In fact, the weather, as expected, showed such marked signs of deterioration at ground level that we were sternly ordered by wireless first to "return to base by midnight" and, later, to "return to base." However, we made the first of the two raids on Tunbridge Wells.

Poor Visibility

As the Harrow took off and circled Feltwell awaiting instructions to proceed, one could only hope that the already poor visibility would not cause difficulties later on. At 19.30 hrs. visibility was probably a little more than a mile, but was, if anything, improving slightly. Those who had flown during the day had found things not at all to their liking. At night, and without the use of much in the way of direction-finding facilities, such weather can be very difficult indeed.

The take-off was interesting as an example of the technique required in the handling of fairly big high-wing monoplanes of present-day loadings. With such a type the assisting ground effect, familiar in the case of low-wing machines, is absent, and it is necessary to hold the Harrow on the ground until plenty of flying speed—as indicated by the appearance of lateral control—has been obtained. The flaps are pumped down to an angle of about fifteen degrees, and any tendency to leave the ground over irregularities is corrected before the flying "moment" arrives. Presumably when taking off from a small aerodrome it would be possible, nevertheless, to force it into the air, hanging on the automatic slots. The Harrow is, incidentally, very well liked for its general stability and safe slow-speed characteristics. Inside, too, there is plenty of room to move about, and no reason for even the newcomer to bump his head against anything—except, perhaps, the reserve petrol tank.

Over the North Sea

From Feltwell the course to Orfordness was 130 deg. M. as calculated by the navigator at his chartboard immediately behind and below the second pilot. This leg was covered in about a quarter of an hour and, after circling the lighthouse, the Harrow was nosed out to sea in the gathering dusk on a course of 95 deg. M., which should have brought us, at the end of a calculated eighty miles, somewhere near the Dutch coast. For the most part the North Sea was covered with what appeared to be a 7/10ths layer of low cloud. It was just as well that we were not proceeding any farther than the coast, since over there was a bank of clouds extending up to perhaps 12,000ft. Our height over the sea varied between 8,000 and 10,000ft. according to rules. Orfordness, on the return journey, was hit spot-on—which is not so bad after 180 miles flying. So far there had been sufficient daylight left to make use of what there was of a natural horizon, but as we neared the English coast again on what was virtually a reciprocal course the cockpit floodlights were adjusted and the navigation lights turned on. For purposes of distinction the Westland bombers kept their lights on all the time, while those of the enemy were only switched on when attacked or when other machines were seen in the vicinity. Since our lights were on and we were, consequently, counted as friends, we had no chance of judging the efficiency or otherwise of the positively enormous number of searchlight units to the south-east and north-east of London. As soon as these units saw our lights they lost all interest in us.

At Orfordness again it was almost dark and the real work was started. Along the Thames Estuary there was little or no sign of any blacking-out, and even without a map it was possible to pick out practically all the towns on the direct line to Tunbridge Wells. Chatham and Rochester, in particular, showed up magnificently, though it would have been a very different matter in real war conditions. The moon was, for the most part, cloud-obscured, and it was only just possible, without the indication given by the relative placings of the different towns, to distinguish the outline of the Thames Estuary. Tunbridge Wells itself appeared as a brilliantly lighted cross set within a cluster of star-dust.

Our objective—the camera obscura which took the place of the bully-beef factory—was apparently lying approximately at the intersection of the cross. Once again, it would have been a very different matter indeed if the town, as, in fact, I was led to expect, had been blacked out. After circling around waiting for our correct time of arrival a signal pyrotechnic bomb was burst (or so it sounded and smelt), and, in due course, our recognition lights flashed and the bomb or bombs duly dropped. For this purpose a Sashalite is fired, and the accuracy or otherwise is calculated by the staff in the camera obscura for a standard wind speed; our height had already been wirelessed for use by the Bomber Command who were in charge of the targets. The residents in Tunbridge Wells remained alive and well.

In the meantime we had received at least two wireless messages demanding that we should be back at our base by midnight, and now another message was received in cryptic but unmistakable terms, "Return to base." No mention of a time. Obviously, the conditions at Feltwell and in that area were deteriorating rapidly. In the London district visibility could not have been better, and from Tilbury or thereabouts it was possible to distinguish the neon beacon at Croydon aerodrome. All of which was comforting enough. If both Feltwell and Mildenhall had turned out to be hopeless it would still have been possible to return to the London area and to have made a landing at, say, North Weald.

The flashing beacon at this aerodrome was, as it happened, the last recognisable landmark before the town of Newmarket was seen, a mile or so to starboard, with the lights somewhat dimmed by the mist. Luckily we were almost directly on our track, otherwise neither Newmarket nor the beacon at Mildenhall might have been picked up. Some idea of war-time conditions was obtained during the comparatively short flight—at a cruising speed of 160 m.p.h.—between North Weald and Newmarket. At times nothing whatever could be seen except an occasional and fitful searchlight or car headlight beam. Night raiding in true conditions is not perhaps the simple and one-sided affair which is so often imagined by the general public. My sympathies are with the bomber crews. Incidentally, the Harrow appeared to have only one altimeter on the dashboard, which seems to be rather odd—even the best instruments fail occasionally. A minute or two after the Mildenhall beacon had been seen and its automatic message translated, the beacon at Feltwell appeared with the lighted tee of the flare path. Our recognition light was flashed, we received the green light giving us permission to land, and we glided or motored down through the haze while the pilot pumped the flaps down and turned to bring the machine into line with the runway.

Navigational Aids

We were not back too early. Within a few minutes it started to rain and half an hour later the conditions were quite a lot worse. In due course Mildenhall, at least, as the area centre, will be equipped with ultra-short-wave blind-approach beacons, and the weather development question will then be not quite so acute. From the point of view of a civilian who is interested primarily in air transport developments where similar problems are experienced, it is difficult to see why, in emergencies, more use is not made of straightforward direction-finding facilities. Those who have knowledge of such matters generally agree that, in the present technical circumstances, there is not a great deal to choose, in accuracy and safety, between the Lorenz and the "ZZ" systems. The latter demands time for its operation, and the Service aerodromes are dealing with squadrons and not with single aeroplanes, but even so it should still be possible to make good use of medium-wave bearings.

H. A. T.

PRIVATE FLYING

Topics of the Day

C.A.G. *Insurance*

WITH the amount of the discussion on and the number of questions still being asked about this C.A.G. business, there is no need to make any excuse for continuing to write about it. It seems that the two most usual and natural queries concern, first, the problem of personal insurance, and second, that of the always necessary refresher dual.

The matter of insurance is still to some extent in the melting pot, though the Air Ministry definitely states that its commitments are already large enough and that it cannot possibly be expected to start any special insurance scheme for the Guardsmen and women. On the other hand, if any company cares to produce a special insurance system, the Ministry will do what it can to help.

In the meantime, the companies have apparently been working out the odds, and do not at present see that they can reasonably reduce their premiums—which, for life assurance flying risks are usually £1 in £100. During the past two decades the aviation insurance companies have, all quietly and without saying a word about it, subsidised civil flying very heavily indeed. I believe that they have sunk and lost a good deal more than a million pounds in Europe alone.

Now they ask, in effect, whether they are expected to assist the C.A.G. scheme with what is virtually a private subsidy. Probably if they were asked nicely they would do it, but for the present business is business. Incidentally, I believe that their estimate of the number of pilots (or their dependants) who will require full payments to be made during the next year is less than ten. I am not sure of their ideas concerning the number of those who will be flying, but this figure is based on the known training capacity of the clubs which are now in existence. Personally, I should have said that, allowing for the greater crowding of the air, more than ten unfortunates will be killed in twelve months. But I may be pessimistic.

Not So Many

THIS question of insurance will undoubtedly reduce the number of those who will carry on with their training. Those with domestic commitments will certainly think twice before they take even the very slight risk involved.

Additionally, of course, a large number of the present applicants will be turned down on medical grounds, and a smaller number may or may not give it up while they are being trained—either because their instructors feel that they are hopeless, or because they themselves find that they do not like or are actually frightened of flying. Fear of the air seems to be a perfectly natural one in some people and has no connection with courage as such; those who suffer from this form of acrophobia (or even anthropophobia) have nothing of which to be ashamed.

One way or another, out of the 16,000 or so applications which have already been received, probably 5,000 or less will be in a position to see the thing through. When the scheme was first announced I discussed the numerical question with various people, whose estimates ranged from 5,000 to 100,000. I stuck to 10,000 as being a reasonable guess at the number of people who would start and complete their training within the next two years.

That Extra Dual

THE refresher dual cost is probably of more immediate interest to the majority of those who are making enquiries. Quite apart from the question of the actual usefulness or otherwise of the number of hours of solo flying which are permitted at the low rates, a certain amount of interim dual will obviously be essential.

In fact, the very fewness of the solo hours permitted—and, consequently, the gaps between practice flights—makes this later dual even more important and necessary. Most lay people imagine that when a pilot has obtained his "A" licence he has learnt to fly and is free to do as he pleases. When he starts his instruction he will soon discover that this is far from being the case, and that in their own interests the club instructors will insist on at least a passing-out circuit or two before every period of solo flying during the first two years.

On the face of it either this dual will have to be paid for at standard rates or the extra solo required to make up the ten hours will be similarly charged.

Quite apart, however, from any special arrangements which will be made between the clubs and the Government, the former will obviously permit this extra flying at the low rate if only in order that the hourage subsidy may be obtained. Normally, it may be expected that each pupil, after obtaining his "A" licence, will be putting in about 15 hours of assorted dual and solo at the C.A.G. rates. Only those pilots who are so hopeless that an uneconomic amount of dual must be given may be asked to pay the higher charges. I believe that, in the case of those pupils who, after, say, six hours *ab initio* dual instruction, are found to be unsuitable material, the Air Ministry will arrange compensation for the clubs.

However, the amount of the entire subsidy is so very big in proportion to the amount paid by the pupils that few difficulties will arise in this connection. The officially suggested hourage charges are, it must be remembered, the maximum limit, and there is no reason at all why clubs should not reduce these figures if they can.

A great deal of fuss has been made about flying for 2s. 6d. an hour. Unless the actual rates are lower than the maximum figures very few people will be flying at this rate, which only applies to the use of lightweights during the week. For a time, at least, there will be a shortage of machines in this class and very few pupils will be able to put in flying time during the week—especially since evening flying will be finished after the end of September.

INDICATOR.

Private Flying

FROM the CLUBS and SCHOOLS

HANWORTH

CIVIL Air Guard applications now total 1,300. Messrs. Cochrane, Tunstall, Calderwood and Dayroll have joined the club. Another member, Mr. Paul Elwell, is taking an instructor's course. Flying time for last week amounted to 89 hr. 5 min.

BORDER

Ideal weather brought many visitors last week, including their Royal Highnesses the Duke and Duchess of Gloucester, who arrived in a Dragonfly piloted by Wing Cdr. Fielden. Flying for the first five days in August totalled 22 hr. 40 min.

BOURNEMOUTH

During the week ending August 7 the flying time amounted to 50 hr. Great interest has been shown in the Civil Air Guard, applications for which have totalled over 200. Two new members, Messrs. J. H. Franklin and J. L. Jukes have joined the club.

BEDFORD

More and more Civil Air Guard members have been enrolled. The club has now acquired its fourth aircraft, a Gipsy I Moth. Tomorrow evening, August 12, the darts championship will be played-off in the clubhouse.

C.A.S.C.

Applicants for the Civil Air Guard through the Corps should be addressed to the Secretary, Civil Aviation Service Corps, Maxwell House, Arundel Street, London, W.C.2. In spite of restrictions, members flew 14 hr. 40 min. last week. Mr. Saunders has now received his "A" licence.

YORKSHIRE

Since the announcement of the Civil Air Guard scheme the Yorkshore Aeroplane Club has received close on one thousand applications. The club has acquired a new aircraft, while at an early date it will take delivery of an ultra light type. Flying time last week totalled 48 hr. 15 min.

PERTH

Such has been the response to the Civil Air Guard scheme that the club has appointed Messrs. G. C. Halley and J. G. Hay as part-time instructors. Mr. Carmichael has now passed his "A" licence tests, while Mr Grosset has joined as a pilot member. Flying time for July totalled 95 hr.

NORWICH

Over 250 enquiries and applications have been received for training in the Civil Air Guard. As soon as the necessary enrolment forms become available they will be posted to all applicants. Two new members, Messrs. G. I M. Woode and R. Kerawalla, have joined the club. The gliding section's activities have been chiefly confined to aero towing, but auto-towed flights were made by Flt. Lt. E. M. Withy and Mr. A. A. Rice.

READING

During the enforced closure of the school, owing to the R.A.F. exercises, the staff were kept busy dealing with the stream of applications for enlistment in the Civil Air Guard. The club was pleased to welcome Miss Joan Parsons back from Africa. Mr. George Miles has taken the Monarch to Cannes.

CINQUE PORTS

Applications continue to be received by the club for the Civil Air Guard. Because this scheme will be started on September 1, the club has decided to cancel the Wakefield Cup Race. Messrs. Beckett, Drowery and Meares have successfully passed their "A" licence tests, while Mr. Meares, a new member, has achieved his first solo. Flying time for last week amounted to 93 hours.

BROOKLANDS

Flying went on as usual last week as the club's activities were not restricted by the Air Ministry ban during the R.A.F. exercises. The recent treasure hunt was won by H.H. Princess Windisgreatz, flying a Puss Moth.

So great has been the number of applications for the Civil Air Guard that even the clerical staff has been temporarily embarrassed. Eight hundred applications have already been dealt with and applicants who have not yet received particulars are assured of attention in the course of a few days. It is hoped to start instruction on September 1.

PENANG

During the month of June the flying time amounted to 160 hr. 55 min., a figure which is the highest since January, 1937. Members took part in the Attack Scheme and Landing Competition recently organised by the Kuala Lumpur Club. Mr. C. Grumitt has now carried out his first solo flight, while Messrs. J. B. M. Messer, H. M. Alexander and J. Halliday have completed their tests for their Straits Settlements "A" licences.

JOHANNESBURG

Another club, this time in South Africa, has devised a means by which really competent flying members and those who have only just obtained their "A" licences may be distinguished. The Johannesburg Light Plane Club has produced a form of old school tie which may only be worn by those who have completed 115 hours, including 25 hours of solo cross-country flying and at least one flight to and from the coast. Additionally, the tie-wearers must have completed a course of instrument flying, be qualified in night-flying, shall have done at least an hour's flying in the front seat of a trainer, and shall have completed certain tests in the C.F.S. sequence. All of which is intended to encourage flying beyond the "A" licence standard.

During the month of May Messrs. P. J. de Villiers, C. McBride, J. V. Lindbergh and R. MacCale made first solos, and the flying total was 642 hours.

The Cannes Rally

THERE were five British competitors in the Cannes rally last month and three of them managed to collect cups. Mr. H. W. H. Moore, who flew over with Mr. Hughesdon, took one, Mr. T. O. Freeman another, and Mr. L. Manilal a third. Altogether about fifteen cups were presented, so the score of three out of five was perhaps not so remarkable after all. Curiously enough, the only home-presented trophy, that offered by the British Aviation Insurance people for the machine flown the greatest distance, went to a Czechoslovakian crew.

The most important prizes, the cups given by the town of Cannes itself and by the local aero club, were won by General Fougier, who, with the assistance of a crew, brought a Caproni 310 over from Italy. At the official dinner, Miss Jean Batten was presented with the Harmon Trophy.

The Ceylon Club

BY now the recently formed Aero Club of Ceylon should have signed an agreement with the Government which will provide a grant of £1,000 and an annual subsidy up to a maximum of £2,200.

The Club already possesses a Tiger Moth, presented by Lord Wakefield, and a syndicate of members own a Gipsy II Moth which will probably be used by the Club. When the grant has been made another Tiger Moth will be purchased. A considerable amount of unassisted flying has already been carried out. Flt. Lt. Duncanson is the instructor, and the patron is H.E. the Governor of Ceylon, Sir Andrew Caldecott.

Needless to say, the Club uses the new Ratmalana aerodrome, which is about nine miles from the centre of Colombo. At present the aerodrome has runs of about 600 yd. in each direction, but it is probable that the area will be extended in due course so that Tata's may be able to use larger machines on their mail service.

"A" Licence Modifications

UNTIL now it has been the habit of club and school instructors to make sure that all pupils know how to recover from a spin in each direction before they are permitted to go off solo. After August 1, however, a spinning and recovery test was to have been added to those which must actually be carried out under observation before a pupil obtains his "A" licence.

A new *Notice to Airmen*, however, now postpones this additional test for the time being—a fact which may be explained by C.A.G. requirements. Not all the machines which are, and will be, used for the new training have aerobatic licences, though all must have C. of A.s in the normal category.

Tricycle Drone

SINCE the normal Drone really needs very little skill for its successful landing—the ground angle being so small that something resembling a rough-and-ready wheeler is all that is necessary—it is rather surprising that the Ely Aero Club should have gone to the trouble of fitting one of their machines with a nose wheel and modifying the main undercarriage to suit. However, it is possible with the normal undercarriage to land in a rather violently tail-down attitude, and the tricycle arrangement will at least encourage those pupils who are doubtful of the exact proximity of the solid earth.

Apparently two members have already made their first solo flights in this machine after taxi-ing practice lasting about fifteen minutes. Obviously, with what little there is needed of skill in the landing process removed, and with a machine which is harmless, dual instruction becomes almost unnecessary.

This particular Drone is fitted with a Bristol Cherub engine and has, consequently, a rather remarkable performance—including, it is claimed, a rate of climb of 600 ft./min. Incidentally, the tail wheel is still there, so that landing may be made in any style.

NAVIGATIONAL EXTENSION

Dealing with the Manston Overflow : Civil Navigation Schools in Action : A Trip with the Pupils

"*Flight*" photographs.

The School machines are conventionally equipped in the matter of wireless, though one of them (left) has its own D/F loop. At the rear of the cabin there is a tail drift sight and a bearing compass. (Above) One of the pupils at work at the chart table while the machine is over the Channel on an instructional trip.

WHEN the work of the School of Air Navigation at Manston was described in *Flight* of May 12 this year, the new scheme was mentioned by which all pilots, before being posted to their squadrons, would pass through the School. As yet this scheme has not been brought into operation, but already, as a result of the expansion, it has been found that Manston cannot possibly cope with the number of pupils. Two civil schools have now been opened, one by Air Service Training at Hamble, and another by Martin Navigation, Ltd., at Shoreham. The latter has now been in action for the past month or two, using a capacious school gymnasium for its ground classrooms, with three fully equipped D.H. Rapides and one shortly-to-be-replaced Dragon, operating from Shoreham Airport, as its flying classrooms.

Generally speaking, the curriculum is the same as that used for the Short Navigation Course at Manston, though it has been found that twelve weeks rather than ten can be more adequately used as a period of instruction. In the three classrooms and two instructors' offices Mr. C. W. Martin is assisted by Messrs. P. J. Sergent and W. A. C. Kingham, each of whom is a "B" licensed pilot with a Second Class Navigator's Licence. Mr. Martin himself has had more than twenty years' experience of this type of work and more recently has been instructing civil pilots. Needless to say, his London school continues to carry on this work.

The Service pupils spend a matter of thirty-six hours in the air during each course and, since the machines are flown by civil pilots assisted by civil radio operators, they are able to concentrate entirely on the serious business of navigation. After preliminary flights, designed to familiarise the pupils with the surrounding landscape, the machines are taken out on trips over the land and sea which are made steadily more difficult from the navigational point of view, the course culminating in a series of exercises involving the interception of surface craft—either the cross-Channel or the Jersey steamers.

Experience

In the course of these exercises, the pupils are considered as being in complete charge, the pilots flying on the courses which are given them and the radio operators obtaining bearings when required. The pilots, however, are by no means mere flying chauffeurs. Each one of them is very experienced and if the pupils provide a course, or series of courses, which are obviously going to bring the machine out to a landfall miles away from that intended—or even to no landfall at all—the pilots know all about it. Additionally, it is necessary for them to complete a private report on each flight. This report not only acts as a check on the rather more complete one which is made by the pupils themselves, but also provides a method by which any errors may more easily be checked to their source. Naturally enough, it is important that both pilots and operators should be experienced, particularly as the instructional flights often take the machines through those parts of the sky used by Jersey Airways. The names of the four pilots are themselves sufficient to dispel any doubts in the matter—R. H. McIntosh, E. H. Newman, W. A. Andrews and C. W. L. Trusk. Every one of them has done a great deal of airline and charter flying, and McIntosh, for instance, will be remembered as one of the very first transport pilots.

While planning instructional routes the cross-Channel air services have been considered, and one unfortunate result of this is that only the central and western part of

"Flight" photograph.

The Martin Navigation fleet consists of three D.H. Rapides and a Dragon

the Channel, where light vessels are few and far between, can be used. Obviously, it is far better practice for a crew to endeavour to hit a small light vessel out in the open sea than a large chunk of land. In this case, the pupils use the Owers and the Le Havre light vessels and the Island of Alderney, while the Newhaven-Dieppe, Southampton-Jersey and similar steamers are used for interception exercises.

A better idea of the sort of work carried out will probably be obtained from the description of an actual flight which we made with two Service pupils in one of the Rapides a week or two ago. In this case a trip was due to be made to Alderney. Mr. Trusk, the pilot, flew on two different courses over Worthing while the pupils took drift readings on the pier with the prismatic type of tail drift-sight. The readings were 4 deg. starboard on a course of 259 T. and 2 deg. port on a course of 39 deg. T. Rapid work with the Service type of C.S.C. showed that the wind was blowing at 7 m.p.h. from 195 deg. T. Double drift problems, incidentally, can be worked out very easily and quickly with this type of C.S.C.

Practical Work

The wind having been estimated and allowed for, the machine flew out from Worthing at 08.26 hrs., the estimated time of arrival at Alderney being 09.33 hrs. at a set air-speed of 110 m.p.h. On the direct track the Owers light vessel lies a few miles to the south-east, and the first bit of minor trouble was encountered when this vessel passed almost directly underneath. Attempts to use the tail drift-sight on it were unavailing, and, as it seemed that the wind-speed and direction must have changed, a sea marker was thrown out through the special hatch provided for this purpose and another sight taken. These sea markers leave the machine as solid blocks of aluminium dust, but after hitting the water and returning to the surface the block has disintegrated, and the result is a useful patch of white on the sea. It is necessary to be fairly quick in using the drift sight, as the patch is soon lost, but the particular instrument used has a movable prism which can be tilted by means of knurled knobs to keep the object in view until it has almost reached the horizon. The view-finder is twisted round during the process until the selected object is travelling straight down between two grid wires, and the drift is then read off on a scale. The reading in this case showed a drift of 10 deg. to starboard, suggesting that the wind-speed had increased, and the course was accordingly altered.

As we neared the French coast it was obvious that the weather was deteriorating rather seriously, with clouds down to 150ft. or less. A weather report from Jersey showed that the clouds would almost certainly be sitting on Alderney, and this island would not, in any case, have been seen to provide a check on the navigation. Furthermore, there were Jersey Airways machines busy on their lawful travels, and this was where experience, both in the case of the pilot and the radio operator, was of paramount importance. Mr. Trusk turned back.

As far as exercises were concerned, the only thing left to do was to work out an E.T.A. for the Owers light vessel, which at least provided a special test of ground-speed accuracy. It was estimated by the pupils that the return had been started when the machine was 24 miles from Alderney. Evidently either this or the combined calculation was suffering from an error. In due course the cloud-covered Isle of Wight came into distant view, and work with a bearing compass—for which two special sockets are provided and movable windows arranged at the rear of the fuselage—showed that we were quite near to the vessel, though the E.T.A. was still several minutes away. However, we not only passed the Owers according to plan, but we hit Shoreham more or less spot-on, so there was nothing wrong with the essential navigation.

During the last phase of the return to the Owers the radio operator had asked for bearings from both the Bristol and the Portsmouth radio stations. The QTEs, respectively 133 deg. and 174 deg., gave us a position which was patently incorrect. In each case the signals had to pass over three coast lines, and the errors were undoubtedly caused by the refraction. The pupils are taught all about the various direction-finding errors, and it might be remarked that, on paper, these appear to be so numerous that pupils can be forgiven for their tendency to be tremendously sceptical about bearings in general. Needless to say, they are not as bad as all that, but it is as well to know just what direction-finding, with or without Adcock aerials, can be depended upon to do. All four machines carry Marconi two-way equipment, and the Dragon has, in addition, a rotating loop aerial for self-navigation. The fact that this equipment is in the Dragon saddens the ground engineers, as this is shortly to be replaced by a Rapide.

A NEW CUTTING FLUID

AFTER extended research, Sternol, Ltd., have produced a clear soluble cutting fluid which is claimed to have some outstanding advantages. For example, it is stated that the bright solution remains quite stable even after standing for many days. Newly machined parts, also, can be put straight into stock with entire confidence that "Sternopal," as the fluid is called, will act as a barrier to the action of rust.

Economy is another claim. For instance, in grinding operations one part of "Sternopal" to 100 parts of water is the approved mixture, while for general machine-shop practice one part of "Sternopal" is added to 35-40 parts of water. The extreme transparency of the fluid is of obvious advantage in precision work, while it is stated that its antiseptic nature is a safeguard for operatives.

The makers are Sternol, Ltd., Royal London House, Finsbury Square, London, E.C.2.

C.A.G. VANGUARD

Flying the First of the Production Tipsy Two-seaters : A Really Useful Performance

(Illustrated with "Flight" Photographs)

IN the midst of all the hullabaloo about the shortage of suitable types for C.A.G. training and the suggestions that we shall have to turn to America for them, there are at least two or three firms which are getting ready to turn out the type of machine which is needed. Perhaps not immediately, indeed, in the quantities which are visualised by the more optimistic supporters of the new scheme, but at least in sufficient numbers to help to fill some of the gaps. For a long time the Tipsy Aircraft Company at Hanworth, for instance, have been working on the development of an improved version of the prototype two-seater, and in last week's issue it was mentioned that the first production model had passed through Martlesham and obtained its C. of A. in the normal category. In due course the machine, which has been stressed for aerobatic work, will go before the powers-that-be for an aerobatic certificate. In the meantime production is being speeded up, and within a relatively short time these two-seaters should be coming out from Hanworth at the rate of one a week.

Since the original machine, which was designed by Mr. E. O. Tips, of Avions Fairey, in Belgium, and built at their factory, was demonstrated in this country, various minor changes have been made and the entire structure has been strengthened up for training and aerobatic work. The wing, for instance, now has increased dihedral and wash-out, and the ailerons have inset hinges and are statically balanced, with weights disposed and faired in along their leading edges.

It will be remembered that the Tipsy has side-by-side seats. Actually, these seats are slightly staggered in relation to one another to give each occupant the maximum of elbow room. The control column is arranged between the two seats, where it is operated directly by the pilot or pupil, while there is an extension in "tiller" style for the use of the passenger or the instructor. The latter is provided with a dual throttle control on the port side and so disposed that it can be comfortably held in his hand. The first machines will be of the open type, and the screen is so designed that there is practically no draught and goggles are absolutely unnecessary. Later machines may be fitted, when required, with a cabin top extension to this already voluminous screen.

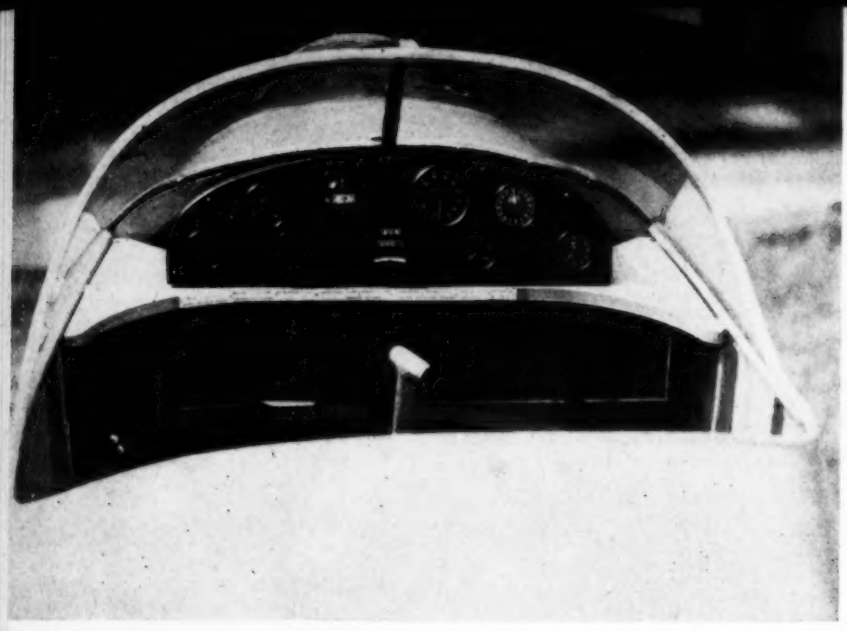
In the course of the test flying, which has been carried out with a special eye to training simplicity and safety, it was decided to limit the elevator control. The effect of this is not only to remove the possibility of a really violent stall, but also to make it practically impossible to overdo the three-point effect while landing. In fact, this modification has taken most of the sting of the landing process. Provided that the hold-off speed is not in excess of 45 m.p.h. or so, even quite a sudden backward movement of the stick produces a fairly good landing with little or no ballooning. Needless to say, at higher approach speeds it is possible to balloon in the ordinary way, so that, even though the landing process is simplified, the need for accuracy in holding a correct approach speed is still there.

The production Tipsy is also fitted with split flaps which are, to all intents and purposes, simple air brakes and do not possess much of the lift-increasing properties of the more usual type. They can within reason, therefore, be used for glide adjustment without the risk of any sudden loss of height, and it is worth mentioning here that the machine can also be flat-sideslipped sufficiently to give one a little additional variation in approach angle. The most effective slip is produced with full rudder and just enough aileron to prevent a turn.

To the pilot who has been accustomed to flying more recently produced machines with really powerful flaps, those on the Tipsy may appear to be somewhat limited in effect. An experimental approach

The general layout of the Tipsy two-seater is admirably shown in this photograph. The extensive and draught-free windscreen arrangement is noteworthy. For this and the other pictures the machine was flown by Flt. Lt. Staniland, the chief test pilot of the Fairey Aviation Company.

This three-quarter-rear view shows both the tail design with one-piece elevator, and the very small ground angle which, coupled with a limited elevator movement, gives something of a tricycle ease to the business of landing the machine.



The preliminary instrument layout. In later models the vertical-reading compass will be replaced by the normal type, which will be mounted below the dashboard, and its place will be taken by a turn indicator. When used for dual instruction the centrally disposed control column is fitted with a "tiller" extension for the instructor on the right.

with the flaps up, however, shows just how much these flaps do. They produce a manageable approach angle and kill the pre-landing float without any of that violent change of angle, or sudden deceleration at the moment of flattening-out, which may get the pupil into considerable difficulties. Nor is it necessary with these flaps to stuff the nose hard down immediately the flap lever has been pulled. The change in gliding angle is relatively small and there should be little possibility of trouble.

Unfortunately, perhaps, the day on which I flew the machine was one with quite a strong and gusty surface wind. On the ground this was probably at times as high as 20 m.p.h., and up above may have been blowing at 40 m.p.h. Such a wind-speed nullifies any attempt to gauge the length of the still-air take-off run and makes the approach angle much less critical. The run was, in the circumstances, not more than ten yards, and a slightly overshot approach into a small aerodrome, or to an attempted spot landing, was a matter of small account. However, the conditions were valuable if only because they showed that the Tipsy could be used in all weathers. When taxi-ing either down, up, or across wind the machine was perfectly stable on the ground, and in most cases the little steerable tail skid provided adequate control. Once or twice, when the wind was blowing really hard, this skid was not sufficiently powerful in its corrective action to turn the machine down-wind against the natural weather-cocking forces, but the turn could always be made, in any case, by using bursts of engine and full rudder.

Another good result of the conditions was that they proved that the Tipsy could be used seriously as a means of cross-country conveyance. It is not very often that upper winds of 40 m.p.h. are experienced in this country, and even on the up-wind leg of a triangular cross-country flight the ground speed still worked out at more than 60 m.p.h., which is useful enough in the circumstances. The Tipsy, with the particular airscrew fitted, cruised at about 95 m.p.h. at 2,400 r.p.m. from the Mikron engine. This engine speed is lower than that normally used for cruising, and an examination of the contents of the tank showed that, during nearly two hours' flying, only about six gallons had been used. The normal consumption figure given for the Mikron is about four gallons an hour.

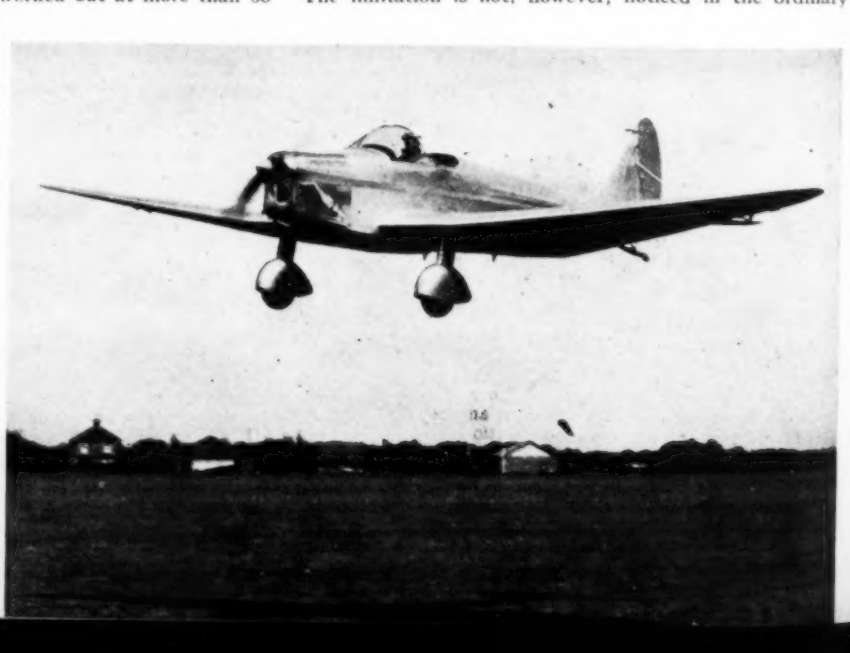
In every way the Tipsy can be considered as a full-sized light aeroplane in spite of its comparatively low power. The take-off is good, the climb is 650 ft./min. at ground level, and the cruising speed ample.

Very little rain was met during this short cross-country, but it would seem that, except in really heavy downpours, the screen would keep the pilot almost perfectly dry. Whether the instructor, seated as he is six inches farther aft, will be quite as comfortable remains to be seen. On my first few practice circuits I took goggles with me, but later left them behind. They are definitely not needed at any time, though a helmet is advisable in the interests of aural and general comfort. The fairly unusual position of the control column between the seats is simply not noticed, and appears to be neither strange nor awkward even to the average pilot who is so much more used to a conventional position for this control.

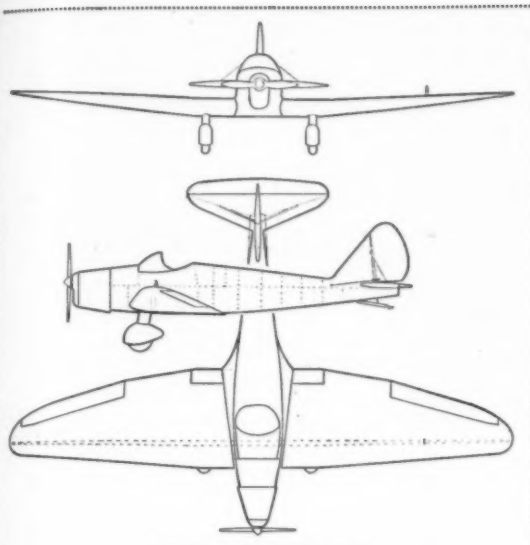
Almost Pusher View

Other than in a pusher design it would be impossible to imagine a better range of view, both on the ground and in the air. One is sitting fairly high in relation to the cowling, and the ground angle is in any case comparatively small. The result is that even while taxi-ing—usually an awkward matter in a side-by-side seater—it is never necessary to rubberneck. One can see everything required on either side. In level flight the nose lies a very long way below the horizon and one is looking immediately over the leading edge. Incidentally, as instructors have already discovered, this side-by-side seating can produce some queer results when a pupil is trying his hand at steep turns for the first time. When turning to the left the nose must apparently be on or above the horizon, and when turning to the right it must be quite a long way below. That provides good training.

In such manœuvres the Tipsy's light and effective ailerons are shown at their best. One can swing effortlessly from left-hand to right-hand vertical turns, and in similar sharp practices my only criticism is that there ought to be, perhaps, a shade more rudder movement. The limitation is not, however, noticed in the ordinary



In spite of the fact that the Tipsy is a side-by-side seater the lines are very clean and there are no unnecessary projections or etceteras. Seated as they are over the main spar, both the pilot and the passenger (or instructor) have a really useful field of view.



TIPSY TWO-SEATER
62 h.p. Walter Mikron II.

Span	31ft. 2in.
Length	22ft.
All-up weight	1,074 lb.
Weight empty	618 lb.
Maximum speed	110 m.p.h.
Cruising speed (2,600 r.p.m.)	100 m.p.h.
Stalling speed	37 m.p.h.
Rate of climb	650 ft./min.
Range at cruising speed (12-gall. tank)	350 miles
Price	£675

Makers: Tipsy Aircraft Co. Ltd., London Air Park, Hanworth, Mddx. Distributors: (South) Brian Allen Aviation Ltd., Croydon Airport. (North) Wards Aircraft, Liverpool Airport.

Equipment of the Tipsy and its Walter Mikron engine includes instruments by Smiths, Scintilla magnetos, K.L.G. plugs, Dunlop wheels and tyres, tanks by R. Malcolm, Ltd., and metal fittings by R. Malcolm, Ltd., and E. D. Abbott, Ltd.

way, even during the take-off, when a slight swing must be corrected, and is probably a good thing from the novice's point of view. What rudder movement there is is light and virile.

Earlier, while speaking of the elevator limitation, I mentioned one of the reasons for this as being concerned with the prevention of a really violent stall. Here, too, the small area of the flaps is an important point. Though the arrival of the stall with the flaps either up or down is very prolonged, it is, when it does arrive, quite sudden. It is difficult always, during slow flying experiments, to be quite sure that the rudder is central, but it seemed that the Tipsy tended to drop its right wing rather than its left. The nose, too, dropped fairly quickly, though at a safe altitude it is difficult to judge the amount of height which is lost during this final spasm of the stall. Probably very little, and control is, in any case, regained immediately. Nevertheless, this characteristic provides the only possible source of danger with the machine for the early soloist. It may be impossible to imagine anyone stretching a glide to the point of reducing the air speed to 35 m.p.h. or less, but such things have been known. Up to the very point of the stall there is ample control in all axes, and the airflow silence, coupled with a somewhat lumpy tick-over of the engine, would tell anyone but a complete moron that the end was near.

This number one production machine has parachute-type seats, and for that reason I was wearing a parachute. Upholstery, as such, was non-existent, and a somewhat solid pack is not always the most comfortable of cushions. Presumably the machine will be produced with the normal type of seat with a backrest which provides rather more natural support. As it was, a couple of hours of continuous flying was quite as much as one could comfortably endure.

Contrary to previous experience with the kind of instruments which are fitted to little aeroplanes, those in the Tipsy worked well. The vertical-reading dashboard-fitted compass of Czechoslovakian design produced results, but the majority of pilots in this country prefer the verge-ring pattern, and production machines will have the more normal compass mounted just below the board. The place in this board at present taken by the compass will, when necessary, be used for the fitting of a turn-indicator which now forms an essential item of equipment for modern flying training.

Although the company is not, apparently, particularly pleased with the finish of this first machine, and say that later models will be much better in this respect, this was, even so, a great deal better than that normally found on light aeroplanes. This finish is obtained by using a series of coats, with a rub-down between each, and a final surface of lacquer, but it is also helped considerably by the way in which the fabric is put on.

The structure is quite straightforward, with a particularly robust box-type main spar and ply leading edge, and with a conventional box fuselage, the top shape of which is obtained by means of half-hoops and stringers on which the fabric is laid. The undercarriage consists of two cantilever legs, with six inches of movement, which are firmly attached to the main spar. H. A. T.

Another Navigational Extension

ELSEWHERE in this issue, in an article describing the new navigation school at Shoreham, it is mentioned that Air Service Training will also be assisting Manston in this work. Recently A.S.T. purchased two Avro 652s—the civil prototype of the Anson—from Imperial Airways and converted them for use as flying classrooms. Each will be flown by an ex-airline pilot with a radio operator, and will carry a navigation instructor and his students. Additionally, the machines will be used by those civilians taking the Long Commercial Course at the School.

Two new instructors have been engaged at Ansty—F/O. A. J. S. Morris, who is taking Vice Cdr. Cooper's place as chief ground instructor, and F/O. J. H. H. Hill.

A New Company

RECENTLY registered under the title of White Allom Aircraft, Ltd., a new company is a subsidiary of White Allom, Ltd., a well-known firm of decorators and furnishers, with offices at 15, St. George Street, Hanover Square, London, W.1.

One of the directors of the latter, Capt. S. Spreat, was associated during the war with Mr. M. H. Volk (now of Brighton-Hove-Shoreham Airport fame) in the building of flying boats. Mr. Volk has been invited to join the board of the new company as technical director in an advisory capacity. There is a large and well-equipped factory, and Mr. Volk states that they are now ready to consider aviation propositions requiring development.

Wallington's Aeronautical Library

A LIST of some hundreds of aviation books which are available to residents in the Wallington district has been issued by the Wallington public library. It includes a very comprehensive list of practical and technical works which would be of great use to ground engineers and students and of interest to amateurs.

Aero-Engine Lubrication

AN informative little book has just been published for those who are interested (in a not too technical way) in the problems which beset the designer of a modern aero engine. Its title is *Aero Engines and Their Lubrication*, and it deals in an admirable manner with the history of the aero engine from the earliest days to the latest types now in use. It shows the reader the various problems that have arisen as the efficiency of engines has increased. The terminology is simple, but, to ensure that the reader may fully understand, a glossary of terms is included.

The author goes on to explain the important part played by correct lubrication in the different types of engine developed, and closes with a chapter on engine control and a final word on operational costs. Thoughout, the book is well illustrated and includes a coloured trilingual lubrication chart for the Rolls-Royce Kestrel engine. *Aero Engines and Their Lubrication* is obtainable from the publishers, C. C. Wakefield and Co., Ltd., Wakefield House, Cheapside, London, E.C.2, price 2s.

FRANK BARNWELL

Famous Pioneer Designer Loses His Life in an Accident : A Personal Appreciation by the Editor

BRITISH aviation circles were shocked to learn of the death, on August 2, of Bristol's chief aircraft designer, Captain Frank Barnwell, O.B.E., A.F.C., F.R.Ae.S., B.Sc., as a result of a flying accident. During the last couple of years or so Capt. Barnwell had been busy in his spare time on the design of a little low-powered monoplane which he intended for his own use and amusement. Originally he had meant to build the machine himself, but the vast activity of the Bristol Aeroplane Co. in connection with the R.A.F. expansion naturally meant an ever-increasing load of work on Barnwell's shoulders, and he therefore decided to entrust the construction of the machine to a firm in Bristol. The little monoplane was finished some time ago, and Barnwell had made a few preliminary flights on it.

On the day in question the air was rather bumpy, and it seems likely that the low-powered machine struck a bump which caused it to stall shortly after the take-off. It crashed on to a road on the edge of Bristol airport.

It appears a strange irony of fate that an aircraft designer who had won world-wide fame and had flown since about 1909 all the machines of his own design, including modern military types, should meet his death in a tiny, low-powered aeroplane which he himself regarded merely as an amusing toy.

A Very Human Man

With the death of Capt. Barnwell the Bristol Aeroplane Co. has suffered a loss which is irreparable. There may be designers who are greater technicians in some particular sphere and on some particular aspect of aircraft design, but it can be said quite truthfully that there is no designer who has had the confidence and loyalty of his entire staff to a greater degree. It is literally true that there was not one member of the Bristol staff who would not do anything in the world for Capt. Barnwell. Service was given him, not through fear, for Barnwell was the most gentle of men, but because everyone felt that it was a privilege to be allowed to work for him.

In his work Capt. Barnwell was one of the neatest and most methodical men. It did not matter whether he was doing an elaborate calculation or merely a simple memorandum; they were all written in his peculiar large, neat handwriting and carefully filed away.

As an example of how Barnwell worked, perhaps I may be permitted to quote a personal experience. I had been worrying him for many months to write me an article for our monthly technical supplement, *The Aircraft Engineer*, but he had been far too busy to spare the time. Then one day I received a letter from him informing me that he was doing an article and that I should be receiving it after the Easter holidays. It duly arrived, and I found it to be written entirely in his own handwriting, and all the charts and graphs done by himself. He had spent the Easter holidays doing it at home. I had naturally assumed that in the archives of the Bristol company there would be much material which could be turned into an article, with very little trouble, by his assistants. But no, that was not Barnwell's way. He set to work and did the whole thing himself from A to Z.

It has been my good fortune to know Frank Barnwell since about 1913 or so, and before that I was privileged to count among my friends his brother, Harold Barnwell, who was chief test pilot to Vickers and lost his life in a flying accident in 1917. Although very dissimilar in appearance and in many other respects, the two brothers had in common a charm which made one treasure their friendship. Frank was rather shy and retiring and would never suffer the limelight of publicity to be pointed in his direction. If asked to write an article or deliver a lecture he usually refused because, as he said, there were lots of people much better qualified than he. And that was not a pose; he meant it quite sincerely. He was modest to a fault.

Born at Lewisham in 1880, Frank Sowter Barnwell was educated at Fettes School, Edinburgh. He served his apprenticeship with a shipbuilding firm and remained in that industry for some years, including a period in America. By 1908 Harold and Frank Barnwell had begun to experiment with aircraft design and construction, and their first monoplane was built near Stirling by the Grampian Motor Co. No great success was achieved with this machine, nor with the next one, built and flown in 1909. By 1911, however, they had produced a monoplane with which Harold made several flights and on which he had more than one crash. That machine, a monoplane, had a flat-twin Grampian engine of about 40 h.p.

About this time the brothers decided to abandon their personal ventures, though not adventures, and Harold joined Vickers, while Frank joined the Bristol company, then called the British and Colonial Aeroplane Co. Harold became chief test pilot and Frank chief draughtsman. With the exception of a short absence in Australia after the war, Frank Barnwell remained with the Bristol company until his death.

Early Successes

Perhaps it can be said that Frank Barnwell laid the foundation of his fame, and that of the Bristol company, with the little Bristol Scout, first exhibited at Olympia in 1914. Harry Busteed, now a Group Captain in the R.A.F. and Commandant of No. 3 Elementary and Reserve Flying Training School, Hamble, shared with Barnwell the responsibility for that machine, which was destined to develop into the Bristol Bullet which was used extensively during the war. Most famous of Barnwell's designs of the war period was, perhaps, the Bristol Fighter, which, under the affectionate nickname the "Brisfit," was built and used in enormous numbers.

From the first "Scout" to the latest Blenheim bomber, Bristol aeroplanes have always been characterised by sound design and excellent workmanship. For the former Barnwell was responsible, and the reputation enjoyed by Bristol products all over the world is the best memorial any aircraft designer could possibly have. To the Bristol company and to Mrs. Barnwell and her boys the sympathy of British aviation will be extended in this hour of bereavement. Frank Barnwell was one of the most lovable men I have ever known, and his death has robbed me personally of a very dear friend whose achievements it has been my good fortune to be privileged to record in the pages of *Flight* for more than 25 years. Of few men can it be said that they had no enemies. Of Frank Barnwell it was literally true. Sadness at his death is increased by the fact that I had discussed his little monoplane with him on many occasions and had arranged with him that when he had thoroughly tested it he should, if he were satisfied with it, write a series of articles about how and why he designed it, these articles to form, as it were, an introduction to the subject of aircraft design for the benefit of the younger generation. I did not see him between the time of his first test flight and the last fatal one, and so we shall never know whether he was satisfied or not. But we may be sure that, with his usual modesty, he would, had he survived, have taken full blame for anything which happened.

C. M. P.

Messages of Condolence

THE following message was sent by Sir Kingsley Wood, Secretary of State for Air, to the widow of Capt. Barnwell:—

"The Air Council have learned with profound regret of the untimely death of your husband, whose name will long be remembered for his pioneer work in the cause of aviation and for the recent services he rendered in the design of aircraft. On the Council's behalf I offer to you an expression of our deepest sympathy in your bereavement."

A message was also sent by Sir Kingsley Wood to the chairman of the Bristol Aeroplane Co., as follows:—

"On behalf of the Air Council I desire to tender expression of our deep regret on learning of the death of Captain Barnwell. His pioneer service in the cause of aviation will long be remembered, and by his tragic death both your company and the nation lose a servant of great distinction."

The funeral took place at Alveston last Saturday.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

FRENCH defences in the Pyrenees are being supplemented by a balloon barrage which will be flown at 16,000ft.

The U.S. Chamber of Commerce reports a gain of 47 per cent. in aircraft and engine sales for the first six months of 1938.

An additional factory, with a capacity of 15-20 aircraft a month, is being erected for the Lockheed Aircraft Corporation.

At last week's Esperanto Congress in London, Mr. M. Lewin, F.R.Ae.S., delivered a lecture on the need for a universal auxiliary language for aviation services and aeronautical science.

Recent returns show that Holland imported 2,580 tons of aircraft and parts, valued at £226,223, during the first six months of the year. These figures compare with 1,840 tons (£223,889) in the corresponding period of 1937.

The Canadian Car and Foundry Co. has despatched the first consignment of machinery for its new aircraft factory in Mexico City. The factory will not only supply home requirements but will also export to Central and South America.

Mr. D. G. Lewis, an Assistant Commissioner in Northern Rhodesia, who was the last British pilot to be shot down by Baron von Richthofen, is visiting Germany as the guest of the Reich Air Ministry and the new Richthofen Squadron.

HARKING BACK IN NEW ZEALAND: Some old-timers still in service with the Royal New Zealand Air Force lined up for inspection by the Governor-General, Lord Galway, at Rongotai Aerodrome. The pretty little fighters in the foreground are Gloster Grebes (*circa* 1928) and behind are Blackburn Baffins.

The Air Ministry states that investigations into the loss of the long-range Wellesley last February indicate that the accident happened near the Scottish coast and that the parts which were found near the Norwegian coast a month later had drifted across the North Sea.

Oil has been struck at the Anglo-American Company's new drilling at Dalkeith, Scotland, and an output of eight to ten barrels of crude oil per day is reported. It is said that the oil is of excellent quality and contains 12 per cent. of petrol and 12 per cent. of kerosene.

HIGH AND DRY (and nearly low and wet): Recollecting a recent *Flight* photograph (taken at the Desford Reserve School), which we jocosely characterised as "the lowest aerial photograph on record," Mr. R. T. Boyd, hon. secretary of the Barnstaple and North Devon Flying Club, sends the above picture. It was taken, he says, from a Moth—and presumably not a Moth on floats. No further contributions, we feel, should be encouraged . . .

Twenty-five Years Ago

(From "Flight" of August 9, 1913.)

"At so recent a date as July 12th . . . we had but 53 machines which could be said to be ready to fly, apart from monoplanes which are not allowed to be flown, while of these 10 were experimental machines which had not even been handed over to the R.F.C."

The British duration record for single-seater sailplanes was broken on July 31 by Mr. H. O. Pick, flying a Grunau Baby from Sutton Bank, the headquarters of the Yorkshire G.C. He stayed aloft 13 hr. 27 min., thus beating by 20 min. the record set up three years ago by Mr. J. C. Neilan.

Last Saturday, Mr. Peter Davis reached a height of 11,300ft. in a sailplane. This does not break Mr. Philip Wills' British height record of 10,080ft., as the flight was made from an aero-tow to 1,500ft. In Germany, on Friday, Capt. Walter Drechsel, in a Minimoa, broke the world sailplane height record by reaching 23,190ft. from an aero-tow over the Wasserkuppe site.

Forthcoming Events

August 20. Eastbourne Flying Club: Garden Party and Opening of New Club-house.
August 27-28. Southend Flying Club: Flying Meeting and Race.
September 10. Cardiff Aeroplane Club: London-Cardiff Race.
September 11-18. Swedish Civil Aviation Week.
September 21. Aero Golfing Society: Cellon Trophy Richmond Golf Club.
November 18-December 4. Paris Aero Show.

COMMERCIAL AVIATION

D.L.H. ATLANTIC PROGRESS: The D.L.H. Blohm and Voss, Ha. 139, *Nordmeer*, flew on Monday of last week from the Azores to Port Washington, Long Island, in under 17 hours. Above is seen a sister-ship, *Nordwind*. An improved version built for the Azores—New York service is the Ha. 139B, the first example of which is named *Nordstern*. Still using Jumo 205 Diesels, the cruising speed has been increased to 270 km./hr. (168 m.p.h.) and the range to 5,200 km. (3,200 miles).

THE WEEK AT CROYDON

"A. Viator's" Causerie on Airline Affairs at London's Main Terminal and Elsewhere

THE R.A.F. Exercises caused less congestion of commercial traffic than might have been expected. It was hazy and at times foggy, so there was less military flying than there might have been. Atmospheric interference with wireless caused a civil machine here and there to stray inadvertently into the prohibited area, thus (to misquote Mr. Jorrocks) experiencing all the horrors of war with only 99 per cent. of its danger. One newspaper invented a "prohibited area" which never existed and then accused K.L.M. of infringing it—but otherwise there was little trouble.

A few more Bank Holiday figures have been issued, and a round figure of 4,000 for the holiday period has been mentioned for Croydon. Imperial Airways had 600 in and out on the Paris run alone, and Air France clocked in with close on 500. British Airways' figures are not available at the moment, but I believe their Paris figures were remarkably good. Olley Air Service had some 500 passengers to and from Deauville, and around 400 to and from Le Touquet.

Irish Sea Airways, a line which steadily increases in popularity all the time, was hard put to it to carry all the passengers who wanted to fly to and from Dublin during the holidays, and so busy was Capt. Olley, what with one thing and another, that he could not move quickly enough on foot, and at one time was seen flashing past on a bicycle with red-hot bearings.

Joy-ride firms, too, had a bumper holiday, so much so that local residents round Croydon complained bitterly of ceaseless flying over their houses. It *is* hard luck on them, but the firms concerned are earning their bread-and-butter and giving pleasure at the same time to other householders and families. The question should not be one between residents and the firm, but between one peace-loving section of the populace and another section which hires aeroplanes for enjoyment.

Lord Runciman's secretaries and staff flew to Prague last Tuesday by K.L.M./C.L.S. line. His Lordship went by boat and things, which was a pity, for the only real international amity worth studying is amongst commercial air people, especially pilots.

The Spanish Ambassador in London has left for a holiday in Spain, which sounds quaint. He travelled by Air France, and they tell me that air liners on the Spanish routes have been known to need patches.

Since Lord Baden Powell went to Switzerland not long ago by Swissair, drove after covey of Boy Scouts have visited the airport to see the machine in which the Chief Scout travelled.

Capt. Dismore, of Imperial Airways, has just completed 25 years' flying and has knocked up a score of 1,250,000 miles for his flying silver jubilee. Lucky he has not spent the same time as an M.P. and done an equivalent amount of good work—they might have made him a Cabinet Minister or something awkward. As it is, he has useful and interesting work ahead, I hear, for he is to be one of the first to fly the Albatross on the Swiss route.

"Dizzy" says he's good for another 25 years' flying, after which, if you ask again, he will discuss his future career with you.

C.A.G. Business

Surrey Flying Services inform me that they have had a rush of enquiries about joining the Civil Air Guard—mostly, it is interesting to note, from younger members of the staffs of Imperial, K.L.M., and other companies on the airport. One gathers that officialdom, when rung up about the C.A.G., is apt to say, "Now, let me see, I *did* hear something about it somewhere, surely. . . You are not by any chance referring to the Guarda Civile in Spain, are you? If so, I'm afraid I cannot help you to join that. Oh, dear, no! Good-bye."

The parachute expert, whose name I can never quite catch, who made those spectacular 150-foot jumps at Luton on the airport opening day, flew to Prague last week with one leg out of commission. It would be just too bad if he had slipped up on the stairs coming down.

Harking back to these air exercises for a moment, I think the air transport companies owe a debt of gratitude to Mr. Jeffs, ably assisted by Mr. Monk, as well as to the control officers in the tower. I'm told that Messrs. Jeffs and Monk took turns of duty throughout the show, and the fact that there was no trouble in the very difficult circumstances is very largely due to their efforts.

COMMERCIAL AVIATION (CONTINUED) : WORLD NEWS

New Atlantic Dornier

THE Dornier works at Friedrichshafen will soon finish a new four-engined Transatlantic machine, the Do. XXVI, the loaded weight of which will be about 18 tons. The machine will have four Jumo 205 Junkers heavy oil engines of 600 h.p. each, and will carry a crew of four and a payload for passengers and mails of 500 kg. (1,100 lb.). With this crew and payload the range is expected to be 6,500 km. (4,040 miles) at a cruising speed of 260 km per hr. (160 m.p.h.). It is rumoured that it will be fitted with retractable floats.

Cairo-Teheran

MISR Airwork are reported to be planning an air service between Cairo and Teheran via Baghdad. Since the Dekhela airport, near Alexandria, is to be transferred to the War Office for military purposes, the Ministry of Transport has decided to lay out a new airport between the Mahmoudieh canal and the railway line. The constructional costs will be small and will be offset by the advantage of the site's proximity to Alexandria.

The Kenya Accident

ON July 27 one of Imperial Airways' old A.W. Atalanta-class machines, *Amalthea*, struck a hillside six miles from Kisumu shortly after taking off. The machine was on its way to Alexandria, and it seems, tragically enough, that this may, in any case, have been her last flight on any African service.

There were no passengers on board, but all four members of the crew, led by Captain M. V. Johnstone, lost their lives. More recently *Amalthea* had been on loan to Wilson Airways for their inland operations, which have been expanded since Imperial Airways put flying boats on to their African trunk service.

Another Hong Kong Service

A MAIL service between Hong Kong and Hanoi, the Far Eastern terminus of the weekly Marseilles-Damascus-Karachi-Calcutta-Rangoon line of Air France, has been started in order to maintain the connection with China and Japan which was, until the war in China, operated by the Chinese Company, South Western Aviation Corporation, between Canton and Hanoi.

The new service carried its first consignment of mails from Hong Kong to Hanoi on July 14, and it has already been decided to carry passengers, using the same Dewoitine 338s which cover the Damascus-Hanoi portion of the route. The first passengers from Hanoi to Hong Kong were booked for August 3. As this extension amounts to one day's flying the through passenger service from Croydon to Hong Kong will take eight days. Leaving England on Wednesday, passengers are in Hong Kong the following Wednesday and in Manila (by Pan-American Airways) on Thursday.

CO-OPERATION : In due course the Trans-Canada Air Lines service will form part of the Empire world circle. Here is Mr. S. J. Hungerford, the president, talking to Capt. D. C. T. Bennett after the latter's flight to Montreal in *Mercury*.

Southampton's Terminal Building

AFTER a good deal of consideration and consequent delay the Southampton Borough Council has now finally decided to erect a new terminal building at the municipal airport. During the past few years Mr. Payne, the manager, and the control officers have done their best with the somewhat cramped accommodation which is available, and the increasing amount of traffic has demanded a more complete and final terminal scheme.

The estimated cost of £47,900 for the new building includes that of laying out a new road, of special improvements to the existing carriageway, the provision of a car park, and of an apron. Designed on utilitarian and dignified lines, the new building will have the usual main hall with information bureau and offices, while above there will be a restaurant. The airport manager's office will be centrally situated on this first floor with a bay window overlooking the whole of the flying field, and provision is being made for four bedrooms for the use of those passengers who are staying overnight. It is hoped that the new building will be completed within a year. The Air Ministry, incidentally, is installing Lorenz blind-approach equipment on which work will begin shortly.

Transatlantic Runways

AIR FRANCE TRANSATLANTIQUE is concerned at the moment about the problems of runways. The four-engined Farman 2231, the first of the two landplanes which are being prepared for special transatlantic experiments, is ready to fly, but nowhere are there concrete runways which satisfy the requirements of strength which the experts insist upon for a full-load take-off.

While visiting Foynes recently, Air France experts examined the runways at Collinstown and found them insufficiently strong, and unless the Government of Eire decide to strengthen them the great trouble to which Air France went to obtain permission to use Eire as a jumping-off ground for North Atlantic flights may have been wasted. The two Farmans have been fitted with airtight cabins for sub-stratospheric flying. Paul Codos will start tests this week.

Meanwhile, the North Atlantic will be flown, also this week, by the old *Lieutenant*, using the Southern route, via Lisbon and the Azores, with Guillaumet, who has just made his 70th crossing of the South Atlantic, in charge.

Socialisation in Finland?

IN 1936 the Finnish Government appointed a special committee, under the leadership of Professor Tulenheimo, to investigate civil aviation and to make recommendations with regard to the future organisation of air services. The Committee recently reported and advised the Government to leave the operation of internal as well as external airlines to a private company.

A preliminary expansion scheme is outlined, according to which two new internal services—Helsinki-Tammerfors-Jyvaskyla-Kuopio-Kajani-Uleaborg-Kemi-Rovaniemi and Helsinki-Kotka-Viborg-Vilmanstrand-Vuoksenniska-Sordavala—should be provided. A fleet of six D.H.86s is suggested for this purpose. The projected scheme would require a very appreciable increase of the present subsidy given to Aero, which is about 2½ million Finnish marks.

The attitude of the Government towards the recommendations of the Committee was rather surprising and caused some very caustic comments in the Press. At a recent Cabinet meeting the Government showed unrestrained dissatisfaction with the Committee's suggestions, obviously because strong political groups desire to socialise commercial aviation in Finland. Altogether disregarding the work of the Tulenheimo Committee, the Government has appointed a new Committee with the engineer, Mr. J. Roiha, in the chair. The new Committee has been ordered to suggest statutes of a new aviation company, in which the Government is to hold at least 60 per cent. of the share capital, the rest of the stock capital to be invested by municipalities and institutions that are interested in aviation. The new Committee is further to suggest a suitable size of stock capital and to fix a reasonable sum to be paid out to the Aero Company by way of goodwill for the handing over of its business to the State. The new Committee seems to have had a bad Press right from the start, as the majority of the newspapers are emphatically opposed to the idea of public administration of Finland's air services.

On August 1 the Aero Company joined D.L.H. in operating the Helsinki-Berlin line. The first Finnish machine on this service left Helsinki on that day for Berlin, via Reval-Riga-Kaunas-Koenigsberg.

Commercial Aviation

Dinard Again

LAST month Air France opened their holiday service to Dinard, via Paris, and now Jersey Airways have started a new service to the same resort. The first trip was made last Tuesday, and the time-table has been dovetailed in with that of Air France so that there are return services on four days of every week. Jerseys operate on Tuesdays and Thursdays and Air France on Saturdays and Mondays.

Another New Deal

AFTER a somewhat stormy passage through Congress, the McCarran-Lea Act was finally approved towards the end of June and its text has now been issued in full in this country.

The Authority consists of five members, and there is an Executive Administrator and an Air Safety Board consisting of three members. Among other things, the Act gives the Authority extensive powers over air transport, aircraft ownership and airline organisation, and the Administrator powers to encourage and foster civil development generally. Additionally, a survey will be made of existing airports and recommendations made about Government participation in their construction. Apparently, the Civil Aeronautics Authority, as it is officially known, supercedes the Bureau of Air Commerce. As an example of its character, the Act demands that at least one member of the Safety Board, for instance, shall be an active airline pilot with more than 3,000 hours of flying experience.

Judging from the comments by various airline operators, the Act is a popular one—which is rather natural after the criticisms, founded and unfounded, which have been directed against the shortly-to-be-defunct Bureau. But opinions are crystallised in a pertinent remark that "the Act will only be as good as the men who comprise its board."

Potez Progress

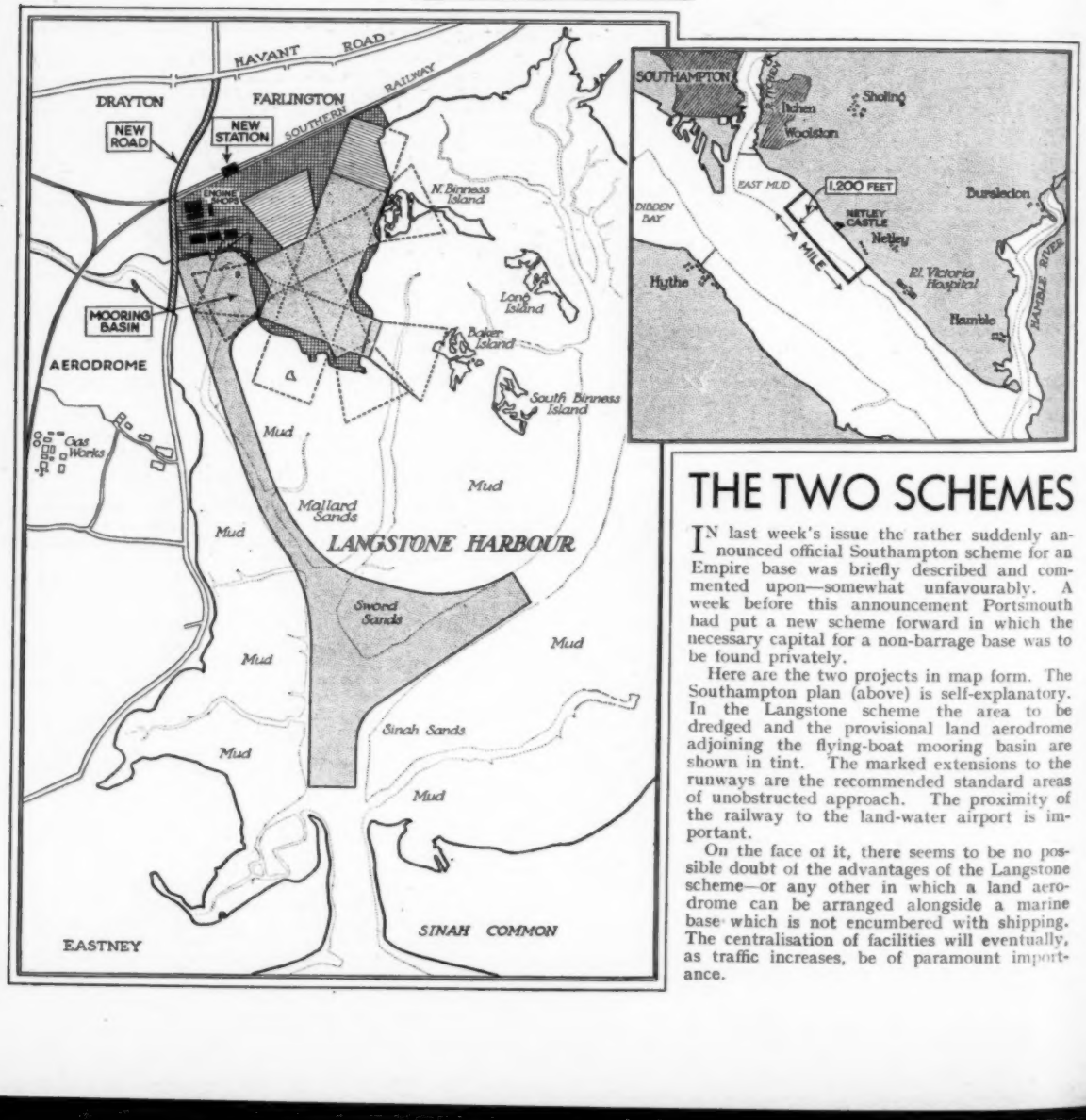
THE four-engined Potez 661, which will be taken over by Air-Afrique, has now been fully equipped, and is about to finish its official Air Ministry tests before starting its 100-hour endurance test.

A modified but faster version of the 661, the Potez 662, with four Gnôme-Rhône 14-Mars of 650 h.p. each, has made its first tests at Meaulte, flown by Labouchère, chief pilot of the S.N.C.A. du Nord, and has now gone on to Villacoublay. This machine, intended for Air France, has a wing area of 64 sq. metres (689 sq. ft.), is of all-metal construction, and has the new type of "V" tail with a fin and rudder at each end. A maximum speed of 450 to 475 km. per hour (280-295 m.p.h.) is expected, which would give a cruising speed in the neighbourhood of 425 km./hr. (273 m.p.h.). The new machine will be equipped for ten to twelve passengers.

The Land's End Accident

SINCE the reformation of the Accidents Branch of the Air Ministry things are evidently beginning to move. The report on the accident at Land's End on June 25 was actually issued on July 29.

In this accident the pilot was killed and six passengers were injured during an approach into the St. Just aerodrome in difficult weather conditions. The report is straightforward enough, the conclusion being reached that the accident "must be attributed to an error of judgment on the part of the pilot who, when endeavouring to land at the aerodrome under adverse weather conditions, lost height and struck the ground when making a low-altitude steep turn." The machine, a Dragon, was in use by Channel Air Ferries.



THE TWO SCHEMES

IN last week's issue the rather suddenly announced official Southampton scheme for an Empire base was briefly described and commented upon—somewhat unfavourably. A week before this announcement Portsmouth had put a new scheme forward in which the necessary capital for a non-barrage base was to be found privately.

Here are the two projects in map form. The Southampton plan (above) is self-explanatory. In the Langstone scheme the area to be dredged and the provisional land aerodrome adjoining the flying-boat mooring basin are shown in tint. The marked extensions to the runways are the recommended standard areas of unobstructed approach. The proximity of the railway to the land-water airport is important.

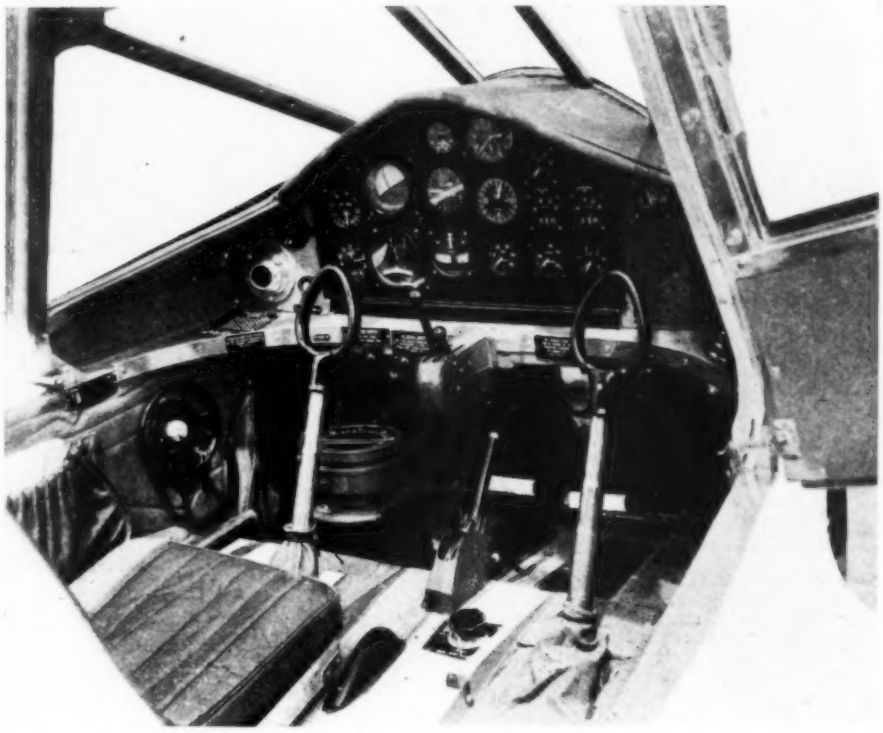
On the face of it, there seems to be no possible doubt of the advantages of the Langstone scheme—or any other in which a land aerodrome can be arranged alongside a marine base which is not encumbered with shipping. The centralisation of facilities will eventually, as traffic increases, be of paramount importance.

ANOTHER FLYING SHOWROOM

Special Demonstration Equipment in a Vega Gull : Testing Up to Date

IN addition to the wireless and gyro-pilot equipped D.H. Dragon which is flown around the European capitals and elsewhere by Mr. H. M. Samuelson, Smiths Aircraft Instruments are now using a Percival Vega Gull for demonstration and test work with instruments in particular. It is being flown by Sqn. Ld. Saker, who will, however, do most of his flying in this country.

A specially shock-mounted panel is fitted, this carrying a complete range of instruments, including a blind-flying group with the new free gyro equipment developed by the company. Apart from this, space has been left for a pair of sub-panels on which new instruments may be tested. One of these panels is arranged on the right of the main layout, so that the pilot can check the readings with those of the standard types, while the other is arranged aft for more earnest observation and testing work.



In the photograph the new free gyro instruments will be seen together immediately above the throttle lever, while beside them will be seen a sensitive altmeter and, on the right, a rate-of-climb indicator.

Co-ordination in India

AT the beginning of this month the long-planned Aviation Association of India was launched. The idea of this Association is primarily that of co-ordination of views and opinions; additionally, however, it will do aviation propaganda work, offer scholarships for those entering flying as a profession, distribute technical assistance, and advise and assist members in obtaining employment. One of the moving spirits is Mr. Vaughan-Fowler, of the Indian Aviation Development Company of Bombay.

D.C.4 Facts

IT has often been claimed by opponents of the tricycle undercarriage idea that the total weight of such equipment would necessarily be high, and that this extra weight would, to some extent, outbalance its advantages. Recently the Douglas Aircraft Company has issued the weight figures for the undercarriage of the D.C.4.

In this machine, the first of its size to be so fitted, the designers would undoubtedly err on the side of safety, and it might be expected that the weight of the entire undercarriage would be rather greater than that of any later machine. Out of the gross weight of 65,000 lb. a total of 3,348 lb. is taken in the main wheel undercarriage with its retraction gear. Another 664 lb. must be added for the weight of the nosewheel with its fittings and, again, with its retraction gear.

The proportion between the different weights is an interesting one, since it gives some approximate indication of the relative loads expected to be applied to the three wheels. On this basis the main undercarriage is expected to take about five times the load taken by the nosewheel. Actually, on test the maximum impact force for the main undercarriage reached 120,000 lb., while 54,000 lb. was the maximum for the nosewheel. Of the total gross weight only a matter of 6 per cent. is contributed by the undercarriage.

The Douglas D.C.4, by the way, has a span of 138ft. 3in., a length of 97ft. 7in., and a maximum height of 24ft. 6½in. The depth of the wings at the fuselage is 4ft. 6in., and the airscrew diameters are 14ft. The wheel track is 26ft. 2in. For day-flying purposes, 42 passengers will be carried, while 30 will be carried when it is used as a sleeper. In each case there is a crew of five. The useful load totals 20,000 lb., and it is worth remembering that many years ago Imperial Airways put a machine, the H.P.42, into service with a passenger accommodation which was almost equally large. In that case, however, the gross weight was less than a third of that of the Douglas. The normal Short Empire boat has an all-up weight of 40,500 lb.

Combating Ice

NOW that the majority of machines being produced for transport operations fulfil the necessary requirements, A.N.D. 13 will shortly be amended in the matter of equipment likely to be affected by ice formation.

All transport machines within the meaning of the words—i.e., those carrying ten or more persons, including the crew—must, when the weather reports indicate the possibility of ice formation, have means of heating the pitot tube or otherwise protecting it, ice-indifferent methods of drive for blind-flying instruments, means for protecting the fixed aerial and D/F loop, and protection for the mechanism of variable-pitch airscrews.

SERVICE AVIATION

THE AIR DETACHMENT of the Junior Division of the O.T.C., at the conclusion of their first training camp, during which they learned much of the work of the R.A.F., were inspected by Marshal of the Royal Air Force Lord Trenchard at Odiham. Lord Trenchard is seen taking the salute during the march-past

Royal Air Force and Official Announcements : Fleet Air Arm News : Military Aviation Abroad

Changes in Commands

THE Air Ministry announces the following appointments:—Air Vice-Marshal Henry Meyrick Cave-Browne-Cave, C.B., D.S.O., D.F.C., to be Air Officer Commanding, No. 25 (Armament) Group, with effect from August 17, *vice* Air Comdre. George Bentley Dacre, D.S.O., who has been in temporary command since March 26.

Air Comdre. George Ranald Macfarlane Reid, D.S.O., M.C., to be Air Officer Commanding, British Forces in Aden, with effect from a date in September, *vice* Air Comdre. William Ashton McClaughry, D.S.O., M.C., D.F.C.

Air Vice-Marshal H. M. Cave-Browne-Cave, born in 1887, was commissioned in the Royal Navy as an Engineer Sub-Lieutenant in 1907 and joined the Royal Flying Corps (Naval Wing) in 1914. In 1919 he was granted a permanent commission as a Wing Commander in the Royal Air Force.

During the Great War his services included the command of "D" Flight, Isle of Grain, and of the Seaplane Stations at Malta and Dunkirk. He was awarded the D.S.O. and D.F.C. In 1919 he attended a course at the Naval Staff College. In 1922 he was posted to the Air Ministry first for technical staff duties and later as Deputy Director of Technical Development. He was in command of the Far East Flight which left England in October, 1927, for Singapore and afterwards flew from Singapore round Australia back to Singapore, and from Singapore to Hong Kong and back—a total distance of more than 27,000 statute miles. In September, 1929, he assumed command of No. 205 Squadron, and, on the formation of the Far East Command in January, 1930, was appointed Officer Commanding. In 1931 he was appointed Director of Technical Development at the Air Ministry and, in 1934, became Air Officer Commanding, Cranwell. Since April, 1937, he has been Air Officer Commanding, No. 16 (Reconnaissance) Group.

He was promoted to Group Captain in 1926, to Air Commodore in 1931 and to his present rank in July, 1935. He was appointed a Companion of the Order of the Bath in the New Year Honours List, 1936.

Air Comdre. G. R. M. Reid, born in 1893, joined the Special Reserve of the Army as a 2nd Lieutenant on probation in August, 1914, and the following year was seconded to the Royal Flying Corps.

During the Great War he served both at home and overseas, being an instructor in aerial fighting and in command of a squadron. For his gallant and distinguished services he was awarded the D.S.O. and M.C. and bar, as well as being mentioned in Despatches. In 1924 he was appointed to command No. 99 Squadron, and, after a period of service in the Middle East Command, passed a course at the R.A.F. Staff College in 1930. He was then posted to Headquarters, Wessex Bombing Area, and two years later passed a course at the Imperial Defence College. In 1933 he was appointed Air Attaché, Washington, and on relinquishing this appointment at the end of 1935 was appointed to command Upper Heyford Station. Since September, 1936, he has commanded Halton Station.

He was promoted to Wing Commander in 1925, to Group Captain in 1932, and to his present rank in July, 1936.

H.M.S. "Argus" in Commission

LAST Wednesday the aircraft carrier *Argus* was due to be commissioned at Plymouth by Capt. W. G. Benn, until recently Director of Navigation at the Admiralty. She has been brought forward from reserve and increases the number of carriers in commission to five.

H.M.S. *Argus* is to be parent ship for Queen Bees, which have hitherto been distributed among various catapult cruisers. In future they will all be carried in the *Argus*. She will also be used for training F.A.A. officers in deck flying.

Fleet Air Arm Technical Officers

WHEN the Fleet Air Arm comes entirely under Naval control the necessary technical officers will be provided partly from the Engineering Branch and partly from the (A) Branch. Selected officers of both branches will undergo a course of training at the R.A.F. establishment at Henlow.

Engineer Officers

Engineer officers who are between 6 months' and 2 years' seniority as Lieutenant (E) and who have completed at least 1 year's sea service subsequent to leaving their training establishment, and who volunteer for aeronautical engineering duties will be eligible for selection. Those selected will be given a course of two years' instruction which will include a full course in flying during the first year, the second year being devoted to aeronautical engineering and flying practice. These officers will then serve for one commission for piloting duties in the Fleet Air Arm in a catapult ship. During this period they will be regarded as additional to the engine-room complement but when not required for Fleet Air Arm duties they will carry out engine-room duties. This period will be followed immediately by two full appointments in the Fleet Air Arm for technical duties. Thereafter they will be appointed to sea-going ships for general engineering duties, and will not again serve with the Fleet Air Arm until after promotion to Commander (E) when they will be available for the senior technical posts in the Fleet Air Arm as Commander (E) or Captain (E).

SERVICE AVIATION (CONTINUED)

While undergoing instruction and while holding appointments for full flying duties (as distinct from aeronautical engineering duties) officers of the rank of Lieutenant (E) and Lieutenant-Commander (E) will receive an allowance of 9s. a day. Officers holding Fleet Air Arm Technical appointments in the rank of Lieutenant (E), Lieutenant-Commander (E) or Commander (E) will receive an allowance of 3s. 6d. a day.

(A) Officers

(A) officers will be selected for technical duty after completing one commission for general flying duties in the Fleet Air Arm and will carry out a course of technical training lasting about two years. Thereafter they will be employed on technical duties in the Fleet Air Arm. Officers so selected will be retained for service for at least 15 years from date of entry, and, in general, until they qualify for retired pay. They will be eligible for promotion to Commander (A) and Captain (A).

(A) officers selected for specialisation in aeronautical engineering will be eligible for an allowance of 6s. a day during their course of technical instruction. After qualifying they will receive pay on the scale laid down for Engineer Officers, and will be eligible for an allowance of 3s. 6d. a day when holding appointments for aeronautical engineering duties, while of the ranks of Lieutenant (A), Lieutenant-Commander (A) or Commander (A).

With a view to the immediate provision of technical officers for the Fleet Air Arm, a number of more senior Engineer officers have been selected to undergo a course of training in aeronautical engineering duties, but will not receive flying instruction. These officers will be eligible for the allowance of 3s. 6d. a day (referred to above) when appointed for aeronautical engineering duties after qualifying.

F.A.A. Courses of Instruction

THE sequence of flying training courses has been brought into line with the standard R.A.F. system, whereby pupil pilots spend one term at a Royal Air Force Elementary and Reserve Flying Training School, followed by two terms at a Royal Air Force Service Flying Training School.

Elementary and Reserve Flying Training Schools

The classes at No. 23 Elementary and Reserve F.T.S., Rochester, will consist of all the ratings in each course and a number of officers. These officers and ratings will be borne on the books of H.M.S. *Pembroke* for pay and discipline, and arrangements for their accommodation and for transport to and from the school will be made by the Commodore, R.N. Barracks, Chatham. They are to wear uniform while under instruction.

The classes at No. 6 Elementary and Reserve F.T.S., Sywell, Northants, and No. 10 Elementary and Reserve F.T.S., Yatesbury, Wilts, will consist of officers only. They will be borne on the books of H.M.S. *Pembroke* for pay and discipline. Accommodation will be provided at these schools. Plain clothes will be worn during the course.

Royal Air Force Service Flying Training Schools

Officers and ratings under instruction at No. 1 Flying Training School, Royal Air Force, will be subject to Royal Air Force discipline and are to conform to Royal Air Force routine and customs. They will continue to be borne for pay on the books of H.M.S. *Pembroke* while at the R.A.F. Service Flying Training School. They will be provided with service accommodation at the School.

Better Pay for Officers

THE Air Ministry announces that an Order is being issued outlining the changes in certain rates of pay and conditions of service for officers of the Royal Air Force. The chief alterations are:—

Scale of Pay.—The scale of pay of officers of the General Duties Branch will be amended as follows:—

	New scale. £ s. d.	*Old scale* £ s. d.
Squadron Leader		
On promotion to the rank	1 10 10	1 10 10
After 2 years in the rank	1 11 8	— — —
After 4 years in the rank	1 12 6	— — —
After 5 years in the rank	— — —	1 12 6
After 6 years in the rank	1 13 4	— — —
After 8 years in the rank	1 14 2	— — —
Wing Commander		
On promotion to the rank	1 16 2	1 16 2
After 1 year in the rank	— — —	1 17 2
After 2 years in the rank	1 18 8	1 18 0
After 3 years in the rank	— — —	1 18 10
After 4 years in the rank	2 1 2	1 19 10
After 5 years in the rank	— — —	2 0 8
After 6 years in the rank	2 3 8	2 1 8
After 7 years in the rank	— — —	2 2 6
After 8 years in the rank	2 6 2	2 3 6
After 9 years in the rank	— — —	2 4 4
After 10 years in the rank	2 8 8	2 5 4
Air Commodore	3 1 0	2 18 4

Entertainment Allowance.—In recognition of the fact that officers commanding stations are in many cases put to expense in the matter of entertainment, it has been decided to make appropriate grants (normally £25 a year) to officers on whom such expenditure falls.

Command Pay.—In conformity with the general principle that R.A.F. rates of pay are related to rank and not to the particular post held in the rank, the command pay at present paid to certain Wing Commanders and Air Commodores of the General Duties Branch will be abolished as a separate emolument.

AIR GUNNERS, with their Lewis guns, observer-type parachutes and R/T.-cum-oxygen masks, photographed at Upwood during the Air Exercises.

Promotion to Flight Lieutenant.—The promotion, subject to recommendation, to the substantive rank of Flight Lieutenant of Flying Officers of the General Duties Branch after two years' service in the rank, and the initial rate of pay of £1 1s. 9d. on such promotion, introduced as a temporary measure, will be made permanent. The increment of pay on the present scale for Flying Officers of two years' service will be abolished.

Half-pay During Unemployment.—The system under which officers of all branches for whom no employment is available are placed on half-pay will be abolished.

Officers who, being fully employable are temporarily unemployed for Service reasons and are to be re-employed in due course, will be posted to a special list and will receive full pay and allowances as though on ordinary leave, except that officers of the rank of Air Vice-Marshal and above, when so posted, will receive full pay only (without allowances) after they have exhausted any leave to which they may be entitled. Officers for whom no further employment will be available after the expiration of an appointment will be given warning to that effect and will be placed upon the retired list upon the termination of the appointment. The existing alternative of being placed on half-pay pending retirement will be abolished.

Retiring Ages.—The normal maximum age of retirement in the ranks of Air Vice-Marshal and above will be 60 but the Air Council may, at their discretion, retain an officer on the active list beyond that age if they judge it to be in the interests of the Service to do so. The ages of compulsory retirement in the ranks of Wing Commander and Squadron Leader will be 50 and 47 respectively.

Retired Pay.—(a) For officers of the rank of Air Vice-Marshal and above, the scale of retired pay will be replaced by a flat rate for each rank as follows:—Air Chief Marshal, £1,300 a year; Air Marshal, £1,120 a year; Air Vice-Marshal, £950 a year.

(b) The scale of retired pay applicable to Group Captains of the General Duties Branch will be amended as follows:—£550 after twenty years' service, increased by £20 for each additional year beyond twenty up to a maximum of £750.

Retirement Gratuities.—The scale of gratuity laid down for officers of the General Duties, Equipment and Accountant branches who retire on or after August 1, 1938, will be extended to a maximum of £1,900 in place of the present maximum of £1,500.

Flying Accidents

THE Air Ministry regrets to announce the following accidents:—

F/O. John Adam, P/O. Albert George Gillespie, P/O. Edward Rayment White, A/C. Patrick Joseph McGovern and A/C. Charles Carter Noxon Suthers lost their lives in an accident which occurred at Great Barton, Suffolk, on August 7, to an aircraft of No. 17 (Bomber) Squadron, Feltwell, Thetford, Norfolk. F/O. Adam was the pilot.

Corpl. William Henry Wheeler lost his life in an accident which occurred at Blackmore, near High Ongar, on August 7, to an aircraft of No. 88 (Bomber) Squadron, Boscombe Down, Amesbury. Flt. Lt. David William Hyde Gardner was the pilot of the aircraft, and A/C. William Thomas Cable the other member of the crew. Flt. Lt. Gardner was slightly injured.

Sgt. Richard Herbert Sweeting and A/C.1 Walter Horace Crofts lost their lives in an accident which occurred at Zerka on August 5 to an aircraft of No. 14 (Bomber) Squadron, Amman, Trans-Jordan. Sgt. Sweeting was the pilot.

Service Aviation

Royal Air Force Gazette

General Duties Branch

Air Comdre. R. M. Hill, M.C., A.F.C., is appointed Director of Technical Development, Air Ministry, vice Air Comdre. R. H. Verney, C.B.E. (August 1). Flt. Lt. C. Stephenson is promoted to the rank of Squadron Leader with effect from August 1 and with seniority of June 1.

The following Flight Lieutenants are promoted to the rank of Squadron Leader (August 1): W. P. J. Thomson, S. S. Murray, G. P. Marvin, M. Watson, W. I. H. Burke, W. R. Baird, J. Mutch, K. R. Coates (Acting Sqn. Ldr.), F. F. Wicks, D.F.C., H. E. Dicken, F. C. Cole, E. J. Corbally, H. R. L. Hood, R. P. Cauthery, B. N. Matson, R. C. Keary, G. F. Whistondale, M. V. Delap, W. R. Worstall, A. E. Louks, B. M. Cary, J. Coverdale, N. C. Hyde, W. T. F. Wightman, C. A. Watt, R. C. Mead, R. E. de T. Vintras, W. R. Sadler, R. S. Darbishire, I. B. Newbiggin, G. N. Warrington, A. M. Watts-Read, P. Heath, J. K. Brew, L. A. Cubitt, B. Paddon, R. V. MacIntyre, D. W. Bayne, A. N. Luxmoore, F. A. J. Pollock-Gore, R. A. McMurtrie.

The following Flying Officers are granted the acting rank of Flight Lieutenant on the dates stated: F. A. Holmes (April 14); D. E. Cattell (May 8); K. C. Gill (May 20); B. E. Smith-Russe, J. N. Dowland (June 14); A. R. Leggate (June 15); R. I. K. Edwards (June 22); G. F. Chater (July 2).

F/O. D. C. Curme (Capt., R.A.) is granted the honorary rank of Flight Lieutenant (May 24); F/O. S. S. Fielden (Capt., R.A.) is granted the honorary rank of Flight Lieutenant (May 27); Lt. Cdr. H. L. Hayes, R.N., Flying Officer, R.A.F., ceases to be attached to the R.A.F. on return to Naval Duty (July 26); Air Comdre. R. H. Verney, C.B.E., is placed on the retired list at his own request (August 1); Sqn. Ldr. J. R. I. Scambler, A.F.C., is placed on the retired list on account of ill-health (August 2).

Equipment Branch

The following Flight Lieutenants are promoted to the rank of Squadron Leader (August 1): F. W. Felgate, G. H. Doveton, M. F. Tomkins, R. G. A. Vallance, C. S. Whellock, P. P. S. Rickard, A. G. Stratford-Tuke, J. E. R. Sowman, E. G. M. Charleson, H. W. Penney.

Accountant Branch

The following Flight Lieutenants are promoted to the rank of Squadron Leader (August 1): F. M. Hall, W. R. Donkin, J. J. T. Rose.

Medical Branch

Flt. Lt. C. Crowley, M.B., B.Ch., D.P.H., is promoted to the rank of Squadron Leader (January 2).

The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated: C. D. Clements, M.R.C.S., L.R.C.P., D.O.; F. V. Mackaine, M.B., B.Ch., J. R. McWhirter, M.B., B.Ch. (seniority, May 3, 1937) (May 3); P. A. Wilkinson, M.R.C.S., L.R.C.P. (seniority July 1, 1937) (July 1); F/O. J. H. Neal, M.R.C.S., L.R.C.P., is promoted to the rank of Flight Lieutenant with effect from May 4, 1937, and with seniority of October 4, 1936. (Substituted for the notification in *Gazette* of June 1, 1937.)

Dental Branch

F/O. B. Blackburne, L.D.S., is promoted to the rank of Flight Lieutenant (May 20); Flt. Lt. B. L. Harrington, B.D.S., is transferred to the Reserve, Class D (August 1).

Chaplains Branch

The Rev. A. S. Giles, B.A., is granted a permanent commission (August 3).

Memorandum

The permission granted to A. M. Parkes to retain the rank of Lieutenant is withdrawn on enlistment in the Territorial Army (March 24).

Princess Mary's Royal Air Force Nursing Service

The following Staff Nurses are promoted to the rank of Sister on the dates stated: Miss G. Jones (July 1); Miss M. I. J. L. Phillips (July 24). Sister Miss E. N. Blackman resigns her appointment (August 2).

Royal Air Force Reserve

Reserve of Air Force Officers

General Duties Branch

W. W. E. Oliver is granted a commission as Flight Lieutenant in Class A with effect from August 2 and with seniority of March 12, 1937; Capt. L. M. S. Essell (R.A.R.O.) is granted a commission as Flight Lieutenant in Class C (April 2); R. P. Smillie is granted a commission as Flight Lieutenant in Class C (April 5); Flt. Lt. J. C. Brice (R.A.F., retd.) is granted a commission in that rank in Class C (April 13).

Royal Air Force Volunteer Reserve

Medical Branch

J. F. Bromley, M.B., Ch.B., M.R.C.P., D.M.R.E., is granted a commission as Flight Lieutenant (August 2).

Auxiliary Air Force

Equipment Branch

Cdr. J. R. D. Freeman (R.N., retd.) is granted a commission as Flight Lieutenant (June 7).

Royal Air Force Appointments

General Duties Branch

Air Commodore.—K. R. Park, M.C., D.F.C., A.D.C., to H.Q., Fighter Command, Stanmore; on appointment as Senior Air Staff Officer, 19.7.38.

Wing Commander.—L. M. Iles,, A.F.C., to Home Aircraft Depot, Henlow; for Engineer duties in the School of Aeronautical Engineering, 15.7.38.

Squadron Leaders.—I. E. Brodie, to H.Q., Bomber Command, Uxbridge; for Armament duties, 19.7.38. A. L. Franks, A.F.C., to No. 2 School of Technical Training (Apprentices), Cosford; for Administrative duties, 15.7.38. L. E. Jarman, to H.Q., Maintenance Command, Andover; for Engineer duties, 20.7.38. R. A. Whyte, to Electrical and Wireless School, Cranwell; for Administrative duties, 18.7.38. J. Warburton, to H.Q., R.A.F., Far East, Singapore; for Air Staff duties, 21.7.38. N. C. Singer, to No. 6 (B.) Sqn., Ismailia, Egypt; to command, 6.7.38.

Flight Lieutenants.—H. G. Leonard-Williams, to R.A.F. College, Cranwell, 14.7.38. J. B. Ussher, to R.A.F. Station, Honington, 4.7.38. J. B. Altham, to R.A.F. Station, Wittering, 10.7.38. N. D. Gilbert-Smith, to No. 4 (A.C.) Sqn., Odiham, 18.7.38. G. N. Hancock, to Aeroplane and Armament Experimental Establishment, Martlesham Heath, 14.7.38. G. H. Foss, to No. 15 (B.) Sqn., Abingdon, 5.7.38. R. E. G. Brittain, to H.Q., No. 23 (Training) Group, Grantham, 18.7.38. J. G. Davis, to R.A.F. Station, Abbotsinch, 18.7.38. D. Finlay, to No. 201 (G.R.) Sqn., Calshot, 18.7.38. J. B. P. Thomas, to No. 204 (G.R.) Sqn., Mount Batten, 18.7.38. B. Paddon, to No. 209 (G.R.) Sqn., Felixstowe, 18.7.38. P. E. Hadow, to No. 217 (G.R.) Sqn., Tangmere, 16.7.38. W. L. Houlbrook, to No. 3 Anti-Aircraft Co-operation Unit, Hal Far, Malta, 16.7.38.

Equipment Branch

Flight Lieutenant.—R. G. A. Vallance to No. 2 School of Technical Training (Apprentices), Cosford, 15.7.38. F. W. Judge, to No. 2 School of Technical Training (Apprentices), Cosford, 15.7.38.

Accountant Branch

Squadron Leader.—S. W. Hill, to No. 1 Air Armament School, Eastchurch; for Accountant duties, 18.7.38.

Medical Branch

Group Captain.—R. A. G. Elliott, to H.Q., Fighter Command, Stanmore; for duty as Deputy Principal (Hygiene), M.O., 20.7.38.

Squadron Leader.—G. S. Strachan, to R.A.F. Station, Manby; for duty as M.O., 20.7.38.

Chaplains Branch

Rev. G. M. Rees, to H.Q., R.A.F., Palestine and Transjordan, Jerusalem; for duty as Chaplain (C. of E.), 1.7.38.

Owing to the greatly increased length of these lists as a result of R.A.F. expansion, ranks are confined to those of Flight Lieutenant and above.

FOREIGN SERVICE NEWS

Potez Production

THE French Air Minister, M. Guy La Chambre, with members of the Press, recently visited the new national factory, S.N.C.A. du Nord, at Meaulte, to see France's fighter-bomber, the Potez 63, in production *en grande série*. A number of the machines are already in service with two-row Hispano-Suiza engines. The works are said to be producing 30 to 40 aircraft per month.

Due to the large-scale adoption of this machine, it is said that the man-hours necessary to produce the type have been reduced from 11,500 to 7,500.

Gladiators and Capronis for Norway

SIX Gloster Gladiators were delivered to the Norwegian Air Force on July 15 and if they are found to be wholly satisfactory for Norwegian purposes, it is planned to commence production of these machines in Norway.

It was reported in *Flight* last week that Norway is also to have two-engined Capronis, presumed to be CA.135s. Further information received states that four machines are to be delivered under a barter agreement, payment being made in Norwegian fish products. In this case also, the contract terms entitle the Norwegian Government to manufacture Caproni bombers under licence if they prove satisfactory.

Ryan Trainers for Guatemala

SIX Ryan primary training machines recently left San Diego for Guatemala. On arrival they were assembled under the supervision of Paul Wilcox, Ryan's chief test pilot, who is testing them and checking out the Air Force instructors on the machines.

The Ryan is an all-metal fuselage, two-seater monoplane powered with a Menasco C4-S engine. This unit is a supercharged, inverted, in-line four, of only 5.95 litres capacity and gives an output of 150 h.p. at 3,000ft.

THE INDUSTRY

New Air-compressor Plant

AN addition to the Tecalemit range of air-compressor equipment is a smaller-capacity plant built on compact but sturdy lines. Measuring 47in. × 19½in. × 34in. overall, including storage tank, it gives 150 lb./sq. in. and 2½ cu. ft. displacement. With any one of three types of motor it costs £32.

New Fuel Gauge

SIMPLE in construction, self-contained (and therefore easy to fit), a new type of aircraft fuel tank gauge, operated on the hydrostatic pressure principle, has recently been marketed by the Nivex Instrument and Gauge Co., Exmouth House, 3-11, Pine Street, London, E.C.1, who have a great many years' experience of fuel gauge work. Copies of a descriptive leaflet are obtainable on application.

Dr. F. W. Haywood's Appointment

DR. F. W. HAYWOOD, Ph.D. (Lond.), B.Sc. (Hons.) Lond., A.I.C., has been appointed chief metallurgist to Wild-Barfield Electric Furnaces, Ltd. (North Road, London, N.7), and will take charge of the new research department nearing completion. Dr. Haywood, who is at present with I.C.I. (Fertilizer and Synthetic Products), Ltd., at Billingham, will begin his new duties later in the year.

Marconi Pioneers

TWO pioneer members of the Marconi Company's staff are in the news this week. Mr. C. E. Rickard, who was for many years chief engineer and technical general manager of the company, and is a director of the Marconi International Marine Communication Company, has completed forty years' service. He was one of the late Marchese Marconi's technical assistants during the inventor's historical experiments from 1898 onwards. The other is Mr. P. W. Paget, who also assisted Marconi, and who has just retired after forty years' service with the company.

Inexpensive Hangars

MOST people are acquainted with the name of Ellis where sectional buildings—e.g., garages, huts, hothouses, etc.—are concerned; not so many, perhaps, realise that aircraft hangars also figure in the range of buildings offered by this firm.

Two standard types are listed. One is the Ellis hangar measuring 50ft. long by 30ft. wide by 8ft. to eaves and 15ft. 6in. to ridge; it is particularly suitable for gliders, and purchasers have included the London Gliding Club. The second type is the "Goodwood" hangar, which makes a special appeal to private aircraft owners. It measures 50ft. by 30ft. by 10ft. (17ft. 6in. to eaves) and is supplied either with 30ft. or 40ft. sliding door opening. In both cases a considerable amount of optional equipment is listed.

These hangars are described in detail in a list issued by the makers, Ellis and Co., Eastway, Hackney Wick, London, E.9

Company Meetings

AT the ordinary general meeting of Handley Page, Ltd., held on July 26, Mr. S. R. Worley, F.C.A. (chairman), said that the year 1937 had been an extremely busy one, and the turnover was again very largely increased. They were now actively engaged on the production of the Hampden type of aircraft. For this and succeeding types they had orders in hand which amounted to several millions, and constituted a record for the company, so that, as far as they could see, their works were going to be actively employed for a very considerable period ahead.

At Cricklewood they had arranged to rent additional premises which formed part of their production unit during the War. As this extra space was unlikely to be used at the end of the expansion programme, they were making arrangements with the Air Ministry that they would limit their liability to the rental of the buildings during the period of expansion.

It would doubtless be agreed that the result of the year's operations was satisfactory, but the profit shown was not unreasonable when one considered the amount of the turnover. They had a profit of £210,126 for the year, but they could not advise the distribution of more than a certain amount of this, because their capital was still small for the work they did. At the commencement of a contract all their financial resources were required, and, indeed, they had to borrow to fulfill their requirements. The directors had therefore decided to place £125,000 to the credit of the general reserve account, and to issue to the Ordinary stockholders one unit of 5s. for every two held.

Mr. Worley read a statement from Mr. Handley Page, who was on his way to Canada with the Aircraft Production Mission. Mr. Handley Page pointed out that the contract for Harrow aircraft which they produced last year was not only completed three months ahead of schedule, but also that the Harrow itself was giving excellent results in service. In the year under review they had disposed of certain of their slot rights. They anticipated that modern technical development would call for a larger use of higher wing loadings so as to obtain greater performance. The need for a sufficiently low landing speed still remained, and for this purpose and for control at slow speeds, the slotted wing was without a rival.

The report was unanimously adopted and the capital proposals approved.

* * *

At the annual general meeting of the Airscrew Co., Ltd., on July 23, the chairman, Mr. J. D. Titler, said, that after a period that was difficult for reasons quite outside the company's control, output was now mounting rapidly.

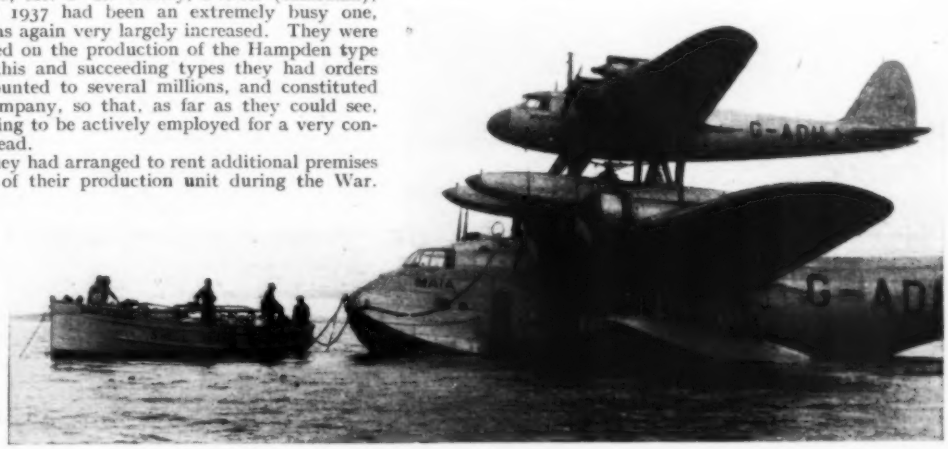
The appropriation account showed an available balance of £28,015 4s. 9d., out of which the directors recommended payment of a final dividend on the Ordinary shares of 10 per cent. (less income-tax), making a total distribution of 20 per cent. (less income-tax) for the year.

Also under consideration was the advisability of bringing the issued capital of the company more into line with the actual capital employed in the business, and to this end they now recommended a free bonus issue of Ordinary shares in the proportion of one new share for every four existing Ordinary shares. This issue would absorb the whole of the present unissued capital, and it was therefore proposed to increase the authorised capital to £220,000 by the creation of 450,000 new Ordinary shares of 2s. each, in order to provide for possible further expansion of the company's business.

* * *

Capt. W. F. Strickland, M.P., chairman of Cornercroft, Ltd., said at the annual meeting on July 26, that the actual profit for the year to June 18 last, before providing for income-tax and National Defence Contribution, amounted to £30,022, compared with £20,156 for the previous year, an increase of £9,866, or approximately 49 per cent.

There was a growing demand for their aeronautical and general engineering output, and the directors were being urged to undertake more work in this department. Additional plant and facilities had recently been installed.



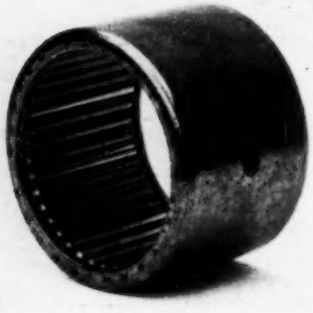
ATLANTIC SPIRIT: The Shell tender at Foynes ministering to *Mercury* and *Maia* before the historic Atlantic flight.

THE INDUSTRY (CONTINUED)

New Utility Bearing

A TYPE of needle bearing which is comparatively new to this country is being introduced for aircraft use. It has as a background, it is stated, over 70 years' development by the American Torrington Company, and manufacture in Britain is contemplated.

Torrington bearings have been used for various duties on road vehicles in this country. In aircraft they are visualised for all such points as control pivots, slots and flaps hinges, and undercarriage bearings.



Simplicity is a feature of the Torrington bearing.

The bearing consists of a number of needle-type rollers, retained at their tapered ends by a lipped-over hardened shell in a machined housing. The rollers surround a hardened inner race.

Though having the characteristics of an "anti-friction" bearing, the Torrington bearing takes up only about the same space as a bronze or white-metal shell.

The construction of the outer shell gives the bearing good grease-retaining qualities, and the bearings, which are made in various types (and, of course, in a wide range of sizes) are inexpensive.

Alfred P. Mill, of Sentinel House, Southampton Row, London, W.C.1, is the Torrington agent.

Donald Macpherson and Co.

IT is stated that the fire which recently occurred at the Cornbrook, Manchester, works of Donald Macpherson and Co., Ltd., makers of aircraft finishes, was not a serious one, and deliveries will not be affected.

Contribution to Success

SMALL but vitally important items in the equipment of the Short-Mayo *Mercury* when she made her Atlantic crossing were the valve springs of the Napier Rapier engine. These were the product of Herbert Terry and Sons, Ltd., of Redditch.

PUBLICATIONS RECEIVED

National Advisory Committee for Aeronautics: Report No. 617: Auto-Ignition and Combustion of Diesel Fuel in a Constant-Volume Bomb, by R. F. Selden, 10 cents. No. 618: Comparative Flight and Full-Scale Wind-Tunnel Measurements of the Maximum Lift of an Airplane, by A. Silverstein, S. Katzoff and J. A. Hootman, 10 cents. No. 619: Drag of Cylinders of Simple Shapes, by W. F. Lindsey, 10 cents. Superintendent of Documents, Washington, D.C., U.S.A.

National Confederation of Employers' Organisations: Factories Act, 1937, Comparative Statement. Millbank House, 2, Wood Street, Westminster, London, S.W.1.

Pilot's "A" Licence, by J. F. Leeming; 8th edition, 3s. 6d., Sir Isaac Pitman and Son.

Airworthiness Handbook for Civil Aircraft, Vol. II: Inspection Section; 7s. 6d., H.M. Stationery Office, Adastral House, Kingsway, London, W.C.2.

My Life, by Jean Batten: 8s. 6d., Geo. G. Harrap and Co., Ltd., 182, High Holborn, London, W.C.1.

Atti del Convegno Interprovinciale di Aerotecnica Milano—A.XV E.F. Associazione Italiana di Aerotecnica, Sindacato Provinciale Fascista Ingegneri, Palazzo delle Borse.

Trunk Air Routes of Europe, April, 1938; Spiral binding and loose leaf style. 15s. Shell Aviation Department, St. Helen's Court, Gt. St. Helen's, London, E.C.3.

Over the North Pole, by G. Baidukov; 5s., Geo. G. Harrap and Co., Ltd., 182, High Holborn, London, W.C.1.

The Development of Sheet-Metal Detail Fittings, by W. S. B. Townsend; 2s. 6d., 2nd Edition. Sir Isaac Pitman and Sons Ltd.

Mussolini, Aviator, and his work for Aviation; by Guido Mattiolo, "L'Aviazione," 504, Corso Umberto, Rome, Italy.

Straightaway Review, 1938, Private circulation—Straight Corporation Ltd., 17, Manchester Square, London, W.1.

The Condensed Library of Engineering: A minimum list of books representative of engineering and its basic sciences, by C. E. Lucke, Stevens Professor of Mechanical Engineering, Columbia University, New York City.

L'Aviation Sovietique; 12 fr., *Les Ailes*, 77, Boulevard Malesherbes, Paris, France.

Science for the Citizen, by Lancelot Hogben; 12s. 6d., George Allen and Unwin Ltd., 40, Museum Street, London, W.C.1.

NEW COMPANIES

In the notes below, for reasons of space, the "objects" of new companies are usually somewhat abbreviated.

MACLAREN UNDERCARRIAGE COMPANY, LTD.—Private company, registered June 30. Capital, £300 in 250 ordinary shares of £1 and 1,000 deferred shares of 1s. each. Objects: To adopt an agreement with O. F. Maclaren, to develop and turn to account the patents, etc., therein mentioned, and to carry on the business of engineers, aircraft and engine builders, etc. The directors are: Eric W. Rodwell and Owen F. Maclaren. Registered office: 1, Oxford Court, Cannon Street London, E.C.

VISUAL DIRECTION, LTD.—Private company, registered July 9. Capital, £1,000. Objects: To acquire letters patent, etc., to manufacture or deal in machinery, etc. The directors are: Wm. Craven-Ellis, M.P., Basil Scruby, Alban J. Roberts, Noel J. Dodd, C.A., Edwd. R. Robertson, Paul G. Levkovitsch. Registered Office: 18, Essex Street, Strand, London, W.C.2.

VERNIER GAUGE AND TOOL CO., LTD.—Private company, registered July 11. Capital, £1,500. Objects: To manufacture and deal in tools, jigs, gauges, gears, vehicles, aircraft, etc. The first directors are:—Arthur E. Harman, Geoffrey L. Jackson and George C. Teebay. Solicitor: G. C. Teebay, 126, Manor Court Road, Nuneaton.

HIDUMINIUM (DEVELOPMENTS), LTD., was registered as a private company on July 9 with a nominal capital of £10,000 in 6,000 "A" and 4,000 "B" shares of £1 each. The objects are to acquire, in connection with the production and fabrication of light metals or alloys (particularly in connection with aluminium), letters patent, concessions, etc. The "A" shares represent shares agreed to be subscribed for by High Duty Alloys, Ltd., or its nominees, and the "B" shares represent shares agreed to be subscribed for by Société des Alliages Legers à Haute Resistance, or its nominees. The first directors are: Wallace C. Devereux, Spence Sanders, Francis J. S. Lawrence, Jean Matter, Philippe Level. The registered office is at 89, Buckingham Avenue, Trading Estate, Slough, Bucks.

CROSS MANUFACTURING CO. (1938) LTD. was registered as a public company on July 23 with a nominal capital of £200,000 in 200,000 shares of £1 each. The objects are to acquire the businesses of the Cross Manufacturing Co., Ltd., and Cross Alloy Cylinders, Ltd. (both in liquidation); to exploit, develop and turn to account any inventions relating to valves or cylinders and pistons for engines or pumps or other inventions; and to carry on the business of mechanical and general engineers, etc. The directors are: Frederick M. Burris, Lt.-Col. Hy. N. Barnett, Arthur Hy. Riseley Solicitors: Rider, Heaton and Co., 8 New Square, Lincolns Inn, London, W.C.2.

WHITE ALLOM AIRCRAFT LTD.—Private company, registered July 20. Capital, £100 in 100 shares of £1 each. Objects: To carry on the business of manufacturers and repairers of and dealers in aircraft and motor vehicles or boats of all kinds, etc. The directors are: Joseph E. Redding, Shirley H. Spreat, Magnus H. Volk, F.R.Ae.S. Registered office: 15, George Street, Hanover Square, London, W.1.

SCOTTISH GLIDING UNION, LTD.—Registered in Edinburgh on July 15 as a company limited by guarantee, without share capital. Objects: To promote, assist and encourage gliding, soaring and aerial navigation in all its forms. Subscribers: W. R. Orme, T. P. Graham, J. G. Macdonald, R. B. Rogerson, G. A. Wellock, A. J. Thorburn, J. W. Gardner. Secretary: R. B. Rogerson. Registered office: 190, West George Street, Glasgow.

INCREASES OF CAPITAL

STRAIGHT CORPORATION, LTD. (17, Manchester Square, London, W.1.).—The nominal capital has been increased by the addition of £5,000 beyond the registered capital of £200,000. The additional capital is divided into 5,000 "A" ordinary shares of £1.

ROLLASON AIRCRAFT SERVICES, LTD. (Airport of London, Croydon).—The nominal capital has been increased by the addition of £5,000 in £1 ordinary shares beyond the registered capital of £10,000. The existing 40,000 shares of 1s. have been consolidated into 2,000 shares of £1. British Continental Airways, Ltd. hold a majority of the issued shares.

PREMIER AIRCRAFT CONSTRUCTIONS, LTD. (320,245) (Maylands Aerodrome, Colchester Road, Harold Park, Romford, Essex).—The nominal capital has been increased by the addition of £4,000 in £1 ordinary shares beyond the registered capital of £3,000.

CHANGES OF NAME

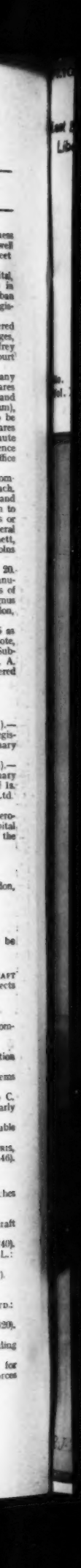
BURY ST. EDMUND'S AIRPORT, LTD., (17, Manchester Square, London, W.1.).—Name changed to Southern Airways, Ltd., on June 17, 1938.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specifications will be printed and abridged etc.)

(Published August 4, 1938).

629. BRUYNE, N. A. DE, AERO RESEARCH, LTD., and DE HAVILLAND AIRCRAFT CO., LTD.: Reinforcement of synthetic resinous materials and objects (488,373).
644. DRIGGS JUN., L. L.: Parachute flares (488,621).
4843. GILLIE, J. W.: Artificial horizons (488,300).
10823. SPERRY GYROSCOPE CO., INC.: Electric starting devices for internal combustion engines (488,388).
16268. LORENZ AKT.-GES., C.: Carrier wave modulating systems (488,393).
24369. AEROPLANE CAPRONI SOC. ANON., and FUSCALDO, O.: Liquid fuel injection systems for internal combustion engines (488,334).
30147. MARCONI'S WIRELESS TELEGRAPH CO., LTD: Directional antenna systems (488,520).
32971. ASKANIA-WERKE AKT.-GES. VORM. CENTRALWERKSTATT DESSAU UND C. BAMBERG-FRIEDENAU: Angular acceleration responsive means particularly for automatic control devices for aircraft (488,601).
34585. SOC. D'INVENTIONS AERONAUTIQUES ET MECANIQUES, S.I.A.M.: Variable pitch propellers (488,477).
12693. INDIA RUBBER GUTTA PERCHA AND TELEGRAPH WORKS CO., LTD., TARRIS, F. J., and WEBB, D.: Hydraulic apparatus employed in aircraft (488,546).

(Published August 11, 1938).

923. ELLOR, J. E.: Valves for liquid containers in aircraft (488,924).
1125. VICKERS (AVIATION) LTD., PIERSON, R. K., and FIRMAN, R. A.: Winches (488,864).
1301. LORENZ AKT.-GES., C.: Electron discharge valves (488,870).
1397. VICKERS (AVIATION) LTD., and ELLIS, D. L.: Aerofoil surfaces for aircraft (488,942).
8877. SPERRY GYROSCOPE CO., INC.: Speed-control means for aircraft (488,740).
11559. BRISTOL AEROPLANE CO. LTD., FEDDEN, A. H. R., and MILNER, H. L.: Airscrews for aircraft (488,673).
18468. POLLOFAS PATENTS, LTD. (Rougé, C. R. A.-M. de.): Aircraft (488,967).
26945. WILLING, M. S.: Parachutes (488,774).
27296. BENDIX AVIATION CORPORATION: Universal joints (488,906).
29393. WILLIAMS, D. L. H., LEATHER, G. B., and GENERAL AIRCRAFT, LTD.: Stretchers (488,977).
30433. RIDEAU, J. R., and DUCRET, A. M.: Anti-icing devices for aircraft (488,820).
31463. HELLER, J. I.: Radio direction-finder (488,823).
32248. TELEFUNKEN GES. FUR DRAHTLOSE TELEGRAPHIE: Navigation-aiding radio systems (488,827).
6407. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES: Arrangements for balancing the torques set up in rudders by the action of kinetic forces (488,986).